

Appendix C: CWD Response Plan for Valley Forge NHP

Introduction

As deer populations increase, risks related to transmission of contagious diseases within these higher density populations are a concern (Joly et al. 2006; Samuel et al. 2003). Chronic wasting disease (CWD) is a fatal, neurological disease that has been identified in free-ranging and captive mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), elk (*Cervus elaphus*), and most recently moose (*Alces alces*). CWD is in the family of diseases known as the transmissible spongiform encephalopathies (TSEs) or prion diseases. Other TSEs include scrapie in sheep, bovine spongiform encephalopathy (BSE) or mad cow disease, and Creutzfeldt-Jakob disease (CJD) in humans. CWD causes brain lesions that result in progressive weight loss, behavioral changes, and eventually death in affected individuals. While much is still unknown about the way this disease spreads among natural hosts, there are indications of the potential for long-term, population-level effects.

Signs of CWD in deer include changes in behavior and body condition. Affected animals can lose their fear of humans, show repetitive movements, or appear depressed but quickly become alert if startled. CWD also results in rapid loss of body condition despite having an appetite. This can lead to affected animals becoming emaciated in the end stages of the disease (NPS 2007c). Once signs of CWD appear, it can vary from a few days to nearly a year until death. In wild populations, however, it is likely that animals late in the clinical stages of the disease live only days. Although the precise origin of CWD will probably never be determined, it is strongly suspected that CWD is a nonnative disease among cervids (NPS 2007c, 2002).

CWD was thought to be isolated to the west and midwest regions of the United States until 2005, when it was confirmed in both New York and West Virginia. Since that time, staff at Valley Forge National Historical Park (NHP) have been tracking the occurrence and detection efforts within Pennsylvania and surrounding states. Natural Resource Management staff also have remained up-to-date on the biology of CWD, management issues surrounding CWD, and development of the Pennsylvania's CWD Response Plan (PCWDTF 2007, 2008). Valley Forge NHP staff also have received training on CWD sampling/testing. In 2007, activities associated with opportunistic and targeted surveillance for CWD were categorically excluded using the appropriate planning process as directed by the National Environmental Policy Act (NEPA) (NPS Director's Order 12, 3.4 E (3) and 3.3 M). This process allowed Valley Forge NHP and other parks to take quick action to initiate CWD surveillance. In 2008, the National Park Service's (NPS) Biological Resource Management Division (BRMD) provided funding to purchase CWD testing supplies to initiate opportunistic and targeted surveillance, as appropriate.

There is currently no evidence that the disease is contagious to humans or domestic livestock; however, significant concerns remain primarily related to the following:

- Ongoing surveillance programs are expensive and draw resources from other wildlife management needs.
- Impacts of CWD on population dynamics of deer and elk are presently unknown. Computer modeling suggests that CWD could substantially reduce infected cervid populations by lowering adult survival rates and destabilizing long-term population dynamics. Recent research on infected and non-infected mule deer in Colorado indicated that the estimated average life expectancy of adult mule deer, once infected with CWD, was only 1.6 years compared to 5.2 years for uninfected deer (Miller et al. 2008).
- In some areas where it occurs, CWD has already begun to alter the management of wild deer and elk populations.
- Public and agency concerns and perceptions about human health risks associated with all TSE's may erode hunter confidence and their willingness to hunt in areas where CWD occurs (CWD Alliance 2008). In Pennsylvania, deer and deer hunting represent an industry contributing 4.8 billion dollars to the commonwealth's economy (PCWDTF 2007).

Due to the uncertainty associated with the disease, as well as social, economic, and biological threats to the community and the affected species, there is much concern among both the public and scientific communities regarding CWD. To address these concerns, in 2002, the director of the NPS provided a memorandum with the following guidance:

- NPS units should cooperate and coordinate with state agencies regarding CWD response.
- NPS units within 60 miles of where CWD has been detected should initiate targeted and opportunistic surveillance by removing deer with clinical signs of CWD, as well as submitting samples from all deer found dead.
- All translocations of deer in or out of NPS units would be prohibited without extensive CWD surveillance.
- Public outreach should be conducted.
- NEPA should be used as a decision-making tool if other actions for CWD detection or response are being considered (NPS 2002).

One of the objectives of the White-tailed Deer Management Plan/Environmental Impact Statement (plan/EIS) for Valley Forge NHP is to reduce the probability of occurrence, promote early detection, and reduce the probability of spread of CWD. Action is needed at this time to address the elevated risk of CWD, as identified through a CWD risk assessment for Valley Forge NHP, and because of the efficiencies and cost savings associated with incorporating a CWD response plan into the deer management plan. The direct relationship between the plan/EIS objectives, alternatives, and impact analysis and CWD Response Plan goals, response strategies, and environmental impacts make integration both feasible and cost-effective. It should be clearly stated that CWD is not currently known to be present in the park or the state of Pennsylvania and that integration of CWD response represents an effort on the part of the NPS to be proactive and fully prepared given the level of risk.

Role of the CWD Science Team

As part of the preparation of the park's CWD Response Plan, a team of technical experts was engaged in the discussion of CWD and potential detection and initial response options available to the NPS. The purpose of these discussions was to provide science-based input to the park on issues relevant to CWD detection and response, as well as incorporation of CWD detection and response actions into the plan/EIS. The team convened via conference calls, meeting three times in June 2008. Topics of discussion included existing conditions surrounding the park; CWD response goals; definitions of terms; approach to establishing implementation thresholds for detection and response; disease transmission; issues related to implementation of various actions; and costs associated with implementation.

The participants in these discussions were limited to persons with scientific background in CWD, deer management and research, and NPS staff. Table C-1 lists the CWD science team participants.

Table C-1 CWD Science Team Members

Name	Title	Organization/Agency
Kristina Heister	Natural Resource Manager	Valley Forge NHP
Madelyn Ruffner	Environmental Quality Specialist	NPS - Environmental Quality Division
Jenny Powers	Wildlife Veterinarian	NPS - BRMD
Mark Graham	Wildlife Biologist	NPS - BRMD
John Karish	Regional Chief Scientist	NPS - Northeast Region
Christopher Rosenberry	Deer Management Section Supervisor	Pennsylvania Game Commission (PGC)
Walter Cottrell	Wildlife Veterinarian	PGC

Definitions

The following terminology was used during the discussion of CWD response for Valley Forge NHP.

Active lethal surveillance. Lethal removal of deer within the park for the purposes of assessing disease prevalence. This action also may minimize the likelihood of CWD becoming established, minimize the likelihood of amplification and spread if the disease is introduced, and may promote elimination of CWD.

Amplification. Increased prevalence of disease within a target population or a region (modified from Samuel et al. 2003).

Cervids. All members of the Cervidae family and hybrids (PCWDTF 2007) including deer, elk, and moose.

Confirmed. Two positive official tests are needed for a confirmed CWD diagnosis (USDA 2006).

Containment. To keep CWD from spreading outside of an area (Samuel et al. 2003).

Containment zone. Defined by the Commonwealth of Pennsylvania as a buffer zone around the 5-mile radius surveillance area established when two or more CWD-positive cases are documented. The buffer area would have a radius at least as large as the surveillance zone radius. State priorities within the containment zone are to contain the disease and reduce the prevalence rate (PCWDTF 2007).

Elimination (aka Eradication). To remove CWD from a target area or population and prevent its reintroduction (Multi-agency Task Force 2002).

Enhanced targeted surveillance. Actions that improve the probability of detecting animals exhibiting clinical signs consistent with CWD and subsequently taking samples for CWD testing from these animals.

Established. When the disease becomes enzootic or when the disease is sustained in a population over a period of time. (Multi-agency Task Force 2002).

Exposure. Contact between the target population and the disease agent. For purposes of this plan, the target population is white-tailed deer.

Opportunistic surveillance. Taking diagnostic samples for CWD testing from cervids found dead or removed through a lethal management action. Cause of death may be culling, disease, trauma (hit by car), or undetermined (NPS 2007c).

Prevalence. The number of disease cases in a population at a designated time without distinction between old and new cases. It is represented by the number of diseased animals divided by the number of susceptible animals (target population) (Powers, pers. comm. 2008) or the total number of cases of a disease in a given location at a specific time (PCWDTF 2007).

Prevention. To maintain a population or an area free from CWD (generally approached by minimizing the risk factors for disease exposure or amplification) (Multi-agency Task Force 2002).

Response. Response to CWD includes disease surveillance (detection) actions as well as short-term actions to assess disease prevalence and distribution, minimize the likelihood of spread to surrounding communities and amplification within local deer populations, and if possible, promote elimination of CWD.

Spreading. When the 5-mile radius surveillance areas established around individual positive CWD cases expand beyond 10 miles from the index or first case.

Surveillance. Activities related to the detection and/or monitoring of a disease.

Surveillance area. Defined by the Commonwealth of Pennsylvania as a 5-mile radius established around the first CWD-positive case within which intensive CWD surveillance occurs (PCWDTF 2007).

Target population. For the purposes of this plan, white-tailed deer.

Targeted surveillance. Lethal removal of deer which exhibit clinical signs consistent with CWD (NPS 2007c).

Risk Assessment

No confirmed cases of CWD have been documented in Pennsylvania. As of 2008, the nearest confirmed case of CWD in free-ranging deer was in West Virginia, over 200 miles from Valley Forge NHP (approximately 25 miles from the Pennsylvania border). Other states with confirmed CWD cases in free-ranging cervids are Colorado, Illinois, Kansas, Nebraska, New Mexico, New York, South Dakota, Wisconsin, Utah, and Wyoming (PCWDTF 2007). Additionally, the nearest confirmed case of CWD in captive populations was in New York. No cases of CWD have been confirmed in Pennsylvania; however, the entire state is considered to be at high risk due to the presence of CWD in an adjacent state (PCWDTF 2007).

Risk factors are attributes of the landscape, environment, or host animals that increase the probability of CWD occurring in a given region or cervid population. By evaluating risk factors, wildlife managers can attempt to predict the population(s) most likely to be affected by CWD. There are two categories of risk factors:

- Exposure – the likelihood that the CWD agent will be introduced into a given population
- Amplification – the risk of increasing the prevalence of the disease once a population has been exposed (NPS 2007c)

Based on the risk factors described in Table C-2, Valley Forge NHP is considered to be at high risk for exposure to and amplification of CWD. If these risk factors could be adequately minimized, the probability of disease introduction into the park's deer population, disease spread within the park or to deer outside the park boundary, and increased prevalence of the disease should it become established, may be lowered. However, many of these risk factors, particularly those related to exposure, are outside the control of the park. The Valley Forge NHP CWD response relies on the policies and actions of the PGC and the Pennsylvania Department of Agriculture (PDA) to minimize the risk of exposure to CWD. Current policy and actions by the PGC and PDA to minimize exposure of deer to CWD include:

- Establishment of an interagency CWD task force to implement a communication/education strategy for state employees, the public, and other stakeholders (e.g., taxidermists, hunters, landfill operators) providing up-to-date information about CWD (risk, symptoms, biosecurity, scientifically acceptable waste disposal methods, feeding of wild cervids).
- Initiation of mandatory CWD herd certification and monitoring programs for the farmed cervid industry.
- Establishment of importation requirements for live cervids, including participation in a recognized CWD herd certification program for at least three years if from a CWD-free state or province, and at least five years if from a state or province known to have CWD.
- Establishment of importation prohibitions for high-risk cervid parts to reduce the likelihood of CWD contaminated materials ending up in the environment of free-ranging or farmed cervids.
- Implementation of opportunistic surveillance for CWD. Opportunistic surveillance requires testing of representative samples of apparently healthy cervids acquired through normal hunting seasons or as a result of deer-vehicle collisions. As of May 2008, approximately 18,070 deer and 260 elk

have been tested by the PGC. No cervids tested positive for CWD (Cottrell, pers. comm. 2008a).

Table C-2 Known or Suspected CWD Risk Factors Identified for Valley Forge NHP

Type of Risk	Risk Factor	Source ^a	Valley Forge NHP
Exposure	Areas adjacent to CWD-positive wildlife	PA	Since 2005, CWD has spread from the Midwest to New York and West Virginia, states adjacent to Pennsylvania. The nearest known case is 200 miles from the park.
	Areas adjacent to land on which CWD-positive animals have lived; Distance to nearest CWD-positive free-ranging deer and/or captive deer or elk facility	PA/NPS	Pennsylvania borders two states (NY, WV) with a history of CWD. The Pennsylvania farmed cervid industry has expanded significantly in recent years. Within Chester and Montgomery Counties (counties which include portions of the park), there are 22 captive cervid facilities. Neighboring Lancaster County contains the greatest number of captive deer facilities in the state (101 facilities) (PCWDTF 2007). None have tested CWD-positive.
	Areas that have received translocated deer or elk from CWD-affected regions; Nearest area with translocated deer or elk, both captive and free-ranging	PA/NPS	The Pennsylvania farmed cervid industry has expanded significantly in recent years. Within Chester and Montgomery Counties (counties which include portions of the park), there are 22 captive cervid facilities. Neighboring Lancaster County contains the greatest number of captive deer facilities in the state (101 facilities) (PCWDTF 2007). It is known that in 2007, at least 9 deer were imported from CWD-affected areas of Wisconsin into Lancaster County captive deer herds (Cottrell, pers. comm. 2008a).
	Areas permitting transport of hunter-killed elk or deer carcasses from areas infected with CWD	PA	Not applicable; PGC has established importation prohibitions for high-risk cervid parts to reduce the likelihood of CWD-contaminated materials ending up in the environment of free-ranging or farmed cervids.
	Rate of immigration/emigration of deer in the area	NPS	Although rates of immigration and emigration at Valley Forge NHP are unknown, assessment of home range and movement relative to the park boundary provides insight. The majority (80%) of female deer at Valley Forge NHP spend more than 50% of their time within the park boundary. They travel, on average, 401 feet from the park boundary. Deer that spend less than 50% of their time in the park travel, on average, 1,325 feet from the boundary. Boundary crossings by deer are most frequent along the southeastern, southwestern, and northwestern park boundaries (Lovallo and Tzilkowski 2003).
Amplification	Areas with high elk or deer population density	PA/NPS	Deer density at Valley Forge NHP was 193 deer per square mile in 2007. The best available data on deer density in areas surrounding the park indicates an average deer density of 29 deer per square mile between 2001 and 2008 (ranging from 8 to 45 deer per square mile).
	Areas with a history of CWD animals or CWD-contaminated environments	PA/NPS	Not applicable.
	Areas with low abundance of large predators	PA/NPS	There are no large predators or recreational hunting within Valley Forge NHP.
	Areas where free-ranging elk or deer are artificially concentrated (baiting, feeding, water development, refuge, and other human related habitat modifications)	PA/NPS	Deer at Valley Forge NHP are concentrated due to human related habitat modifications outside the park, lack of natural predators, and creation of ideal deer habitat within the park.

^a Source refers to risk factors identified and defined by *Pennsylvania's Chronic Wasting Disease Response Plan* (PCWDTF 2007) and the *NPS Reference Notebook to Understanding Chronic Wasting Disease* (2007c).

CWD Response Goals

The goals of the CWD Response Plan at Valley Forge NHP are:

- Determine the ongoing risk of CWD infection in the white-tailed deer population at Valley Forge NHP based on known disease risk factors.
- Develop adaptive management protocols for the detection of CWD presence, prevalence, and distribution, as well as response to the disease based on the proximity of a confirmed case of CWD to the park boundary and proximity of the park to a state-established CWD containment zone.
- Cooperate and coordinate with state wildlife and agricultural agencies to promote 99% confidence of detecting the disease if it is present in the area at a prevalence of at least 1% and respond to positive or confirmed cases. It is assumed that data from both state and federal lands would be pooled to achieve a sample size sufficient to ensure a high level of confidence in detection of CWD, if it is present, and assess prevalence if CWD is confirmed.
- Minimize the likelihood of CWD becoming established within the park’s deer population, and if CWD becomes established, minimize the likelihood of amplification and spread and promote elimination of CWD, if possible, from the park or state-established CWD containment zone.
- Promote communication with state wildlife and agricultural agencies, other stakeholders, and the public to ensure timely distribution of accurate information related to CWD and associated management actions.

Thresholds for Response

CWD response includes disease surveillance (detection) actions, actions to assess disease prevalence and distribution, actions to minimize the likelihood of spread to surrounding communities and amplification within local deer populations, and if possible, actions to promote elimination of CWD. Response to a confirmed case of CWD would be defined by the distance of the case from the park boundary and location of the park relative to a state-established CWD containment zone. Three implementation zones have been established, reflecting established thresholds for increasing CWD response (Figure C-1). Although thresholds are based on confirmation of CWD outside the park boundary, CWD response actions associated with each implementation zone would only occur within the park boundary. The three CWD response thresholds for the park are:

- | | |
|---------------|--|
| Zone 3 | Closest confirmed case of CWD is more than 60 miles from the park boundary |
| Zone 2 | Closest confirmed case of CWD is less than or equal to 60 miles but more than 5 miles from the park boundary and the park is not within a state-established CWD containment zone |
| Zone 1 | Closest confirmed case of CWD is less than or equal to 5 miles from the park boundary or the park falls within a state-established CWD containment zone |

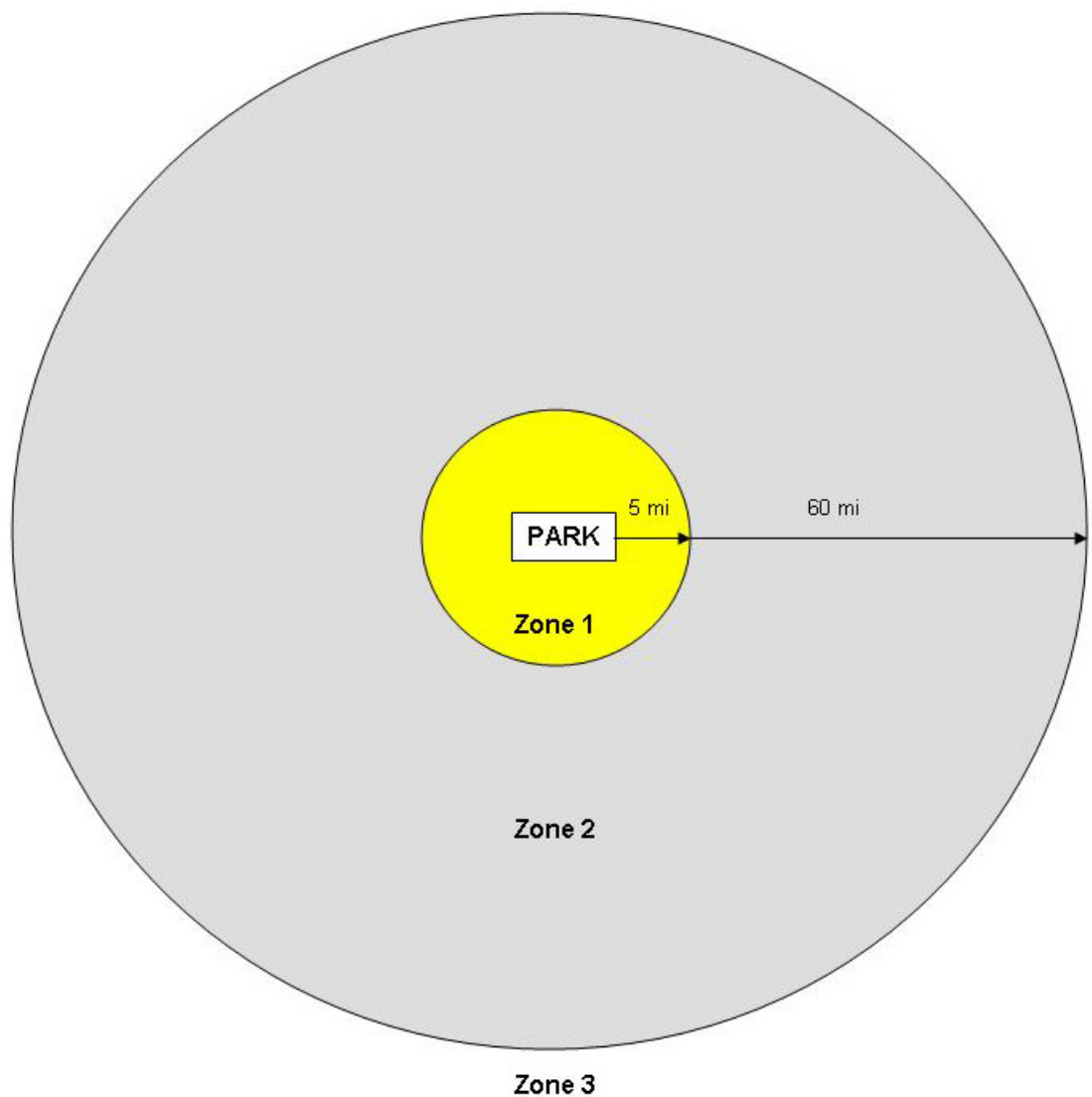


Figure C-1 CWD Implementation Zones at Valley Forge NHP

Note: Not to scale

Implementation Zones 3 and 2 were determined based on current NPS guidance (NPS 2002, 2007c). Implementation Zone 1 is based on the maximum distance female deer within the park are known to travel (Lovallo and Tzilkowski 2003), the average male dispersal distance within the Ridge and Valley Province of Pennsylvania, and is consistent with the 5-mile radius surveillance and containment zones established in the PA CWD Response Plan (PCWDTF 2007). Evaluation of deer movements relative to the park boundary between 1997 and 1999 indicated the maximum distance female deer traveled from the park boundary was 1.23 miles (6,512 feet), and 5 miles is expected to contain most doe movements. The PGC also evaluated dispersal distance and dispersal rate for male deer across the state between 2002 and 2003. Average dispersal distance of young males, in areas similar to Valley Forge NHP, was 4.35 miles (Long et al. 2005). Therefore, a 5-mile boundary was selected for Zone 1. All actions would be closely coordinated with the PGC and PDA due to the scale of the area identified as necessary to address CWD (minimum of 79 square miles) relative to park size (5.3 square miles). A summary of response actions associated with the implementation zones is provided in Table C-3.

Table C-3 Actions Associated with CWD Response Based on Established Implementation Zones at Valley Forge NHP

Implementation Zone	Opportunistic Surveillance	Targeted Surveillance	Enhanced Targeted Surveillance	Test and Cull ^a	Active Lethal Surveillance ^b	Coordination with PGC and PDA
Zone 3	X					X
Zone 2	X	X				X
Zone 1	X	X	X	X	X	X

a To be implemented only under the combined nonlethal deer management alternative (Alternative B) described in the plan/EIS.

b To be implemented only under deer management alternatives that include lethal actions (Alternatives C and D), as described in the plan/EIS.

Inclusion of the park (or portions thereof) within a state-established containment zone as an element of the response threshold for Zone 1 is based on the CWD science team recommendation that the park become part of the state's actions once a containment area has been established, regardless of proximity of the confirmed case to the park boundary. Overall, CWD response within the park would represent one component of the broad-scale, long-term CWD management effort by the state. This plan also assumes that CWD is likely present within the park if the Zone 1 threshold is reached.

Implementation Zone 3

If a case of CWD was confirmed more than 60 miles from the park boundary (i.e., within a state bordering Pennsylvania), the park would follow NPS recommendations (NPS 2002, 2007c) and continue to conduct opportunistic surveillance for the presence of CWD within the park. Opportunistic surveillance involves taking diagnostic samples for testing from deer found dead or removed through a park management activity. Opportunistic surveillance has little, if any, adverse impact on current populations. This action is consistent with "active surveillance" described in *Pennsylvania's Chronic Wasting Disease Management Plan* (PCWDTF 2007).

A standard operating procedure for identifying and removing appropriate tissue samples for testing would be developed along with training of park staff to implement this action. This protocol would follow CWD surveillance guidance for Valley Forge NHP (i.e., sample collection, storage, and submission; safe handling procedures; shipping; etc.) and training provided by the NPS-BRMD (NPS 2007c). Tissue samples would be tested by the NPS-BRMD or at the New Bolton Center, University of Pennsylvania's veterinary diagnostics laboratory. The only other laboratory certified by the U.S. Department of Agriculture (USDA) to test deer and elk tissues for the presence of CWD in Pennsylvania is the Pennsylvania Veterinary Laboratory in Harrisburg, Pennsylvania. It is estimated that up to three weeks may be required to complete CWD testing regardless of the service provider.

It is assumed that animals killed in collisions with vehicles may be a biased sample that is likely to be a more sensitive measure for identifying animals carrying the disease. Based on an average of 87 deer-vehicle collisions reported annually between 1997 and 2007, it is estimated that a minimum of 51 deer (4% of total park deer population estimate of 1,277 individuals) would be tested annually. The number of deer tested may be limited by use of a contractor to remove dead deer from park roadways, need to euthanize some animals due to injury (possible head shots), and

condition of some road-killed deer. Sample size also may vary depending on selection of the preferred deer management strategy. The park also would continue to coordinate with the PGC and/or agricultural agencies regarding surveillance methods and results.

Activities included in Zone 3 were categorically excluded using the appropriate NEPA process in 2007, and therefore are included under all deer management alternatives, including the no-action alternative (Alternative A) in the plan/EIS.

Implementation Zone 2

If a case of CWD was confirmed between 5 and 60 miles of the park boundary and the park did not fall within a state-established CWD containment zone, Valley Forge NHP would continue to implement opportunistic surveillance, as described above. Additional actions would include training of NPS employees, volunteers, and others to recognize and report deer exhibiting clinical signs of CWD, monitoring for deer exhibiting clinical signs, and implementing targeted surveillance consistent with NPS guidance (NPS 2007c). Monitoring would consist of visual surveys for deer exhibiting clinical signs of CWD conducted by park staff and volunteers during their daily work activities, which often involve travel throughout the park or direct interaction with deer (e.g., deer counts, deer-vehicle collision response). Targeted surveillance has negligible adverse effects on the entire population, removes a potential source of CWD infection, and is an efficient means of detecting new centers of infection (Miller et al. 2000). One limitation to targeted surveillance is that clinically affected animals presumably shed infectious prions before they are visibly ill. Thus, environmental contamination and direct transmission may occur before the animal is removed (NPS 2007c). The park would develop standard operating procedures to implement these actions. This action is consistent with “targeted surveillance” described in Pennsylvania’s CWD management plan (PCWDTF 2007).

Increased coordination with the PGC and PDA would be initiated to pool samples to reach the desired detection level and to monitor and evaluate changes in CWD risk to the park. The desired detection level established in the state CWD management plan is 99% confidence in detecting CWD if it is present at a prevalence of at least 1%. Targeted surveillance may reduce the sample size required to achieve the desired level of detection as evidenced by the fact that nearly half of the CWD-positive populations in Colorado have been detected using this method (Conner, Krumm, and Miller 2005). It is estimated that the number of deer tested through targeted surveillance would vary depending on the number of deer exhibiting clinical signs of CWD and selection of the preferred deer management strategy in the plan/EIS.

Implementation Zone 1

If a confirmed CWD case occurs within 5 miles of the park boundary or the park (or a portion of the park) falls within a state-established containment zone, activities described under Zones 2 and 3 above would continue within the park. Once this threshold is reached, it is assumed that CWD is likely within the park.

Under all deer management alternatives in the plan/EIS, including Alternative A (no-action), additional actions triggered by Zone 1 would include enhanced targeted surveillance in the form of dedicated staff and volunteer time to monitor the park deer population for clinical signs of CWD on a regular basis. Under Alternative B

(combined nonlethal actions), live testing and culling of CWD-positive deer would be implemented. Under deer management alternatives that include lethal actions (Alternatives C and D), the park would initiate a rapid reduction of the deer population to quickly achieve the target deer density. This may include a one-time reduction of the population for the purposes of disease response. All actions would be conducted in cooperation with the state to ensure a coordinated response. The NPS would contribute all deer obtained through surveillance and response activities to the state sampling effort to assess prevalence and distribution.

Test and Cull

Under the combined nonlethal deer management alternative (Alternative B) in the plan/EIS, a test and cull approach would be used to enhance CWD detection and monitoring efforts. The technique requires capture, general anesthesia, training in biopsy techniques, and the ability to test large proportions of the population (NPS 2007c). Tonsillar biopsy has been used in limited situations to test deer and cull CWD-positive members of the population (NPS 2007c; Wolfe, Miller, and Williams 2004). Initial treatment of deer with a reproductive control agent, under Alternative B in the plan/EIS, requires capture for the purpose of marking individuals as “treated.” Therefore, a test and cull approach is considered reasonable with minimal additional effort. Training on tonsillar biopsy techniques and appropriate handling and storage of tissue samples would be provided by the NPS BRMD.

Animals would be individually marked to ensure CWD-positive animals could be relocated, and radio collars may be used to facilitate relocation of individuals that have moved outside the park. CWD-positive animals would be removed from the population by qualified federal or state employees or contractors. The number of animals to be tested annually would be expected to be the same as the number initially treated with a reproductive control agent under Alternative B in the plan/EIS.

Limitations of this approach include the fact that animals initially captured and marked as “treated” with a reproductive control agent would not be anesthetized and handled for subsequent reproductive control treatments (delivered remotely). These individuals would be excluded from CWD testing after the first year, which may result in large variations in sample size over time. Additionally, reproductive control, as described under Alternative B in the plan/EIS, excludes male deer from the surveillance effort. Dispersal of male deer may be one of the primary means of CWD spread. Variation in sample size and exclusion of male deer from the sampling effort may increase the potential of failing to detect the disease if it is present.

Active Lethal Surveillance

The term active lethal surveillance refers to lethal removal of deer within the park for the purposes of assessing disease presence, prevalence, and distribution. These actions may also minimize the likelihood of CWD becoming established, minimize the likelihood of amplification and spread if the disease is introduced, and promote elimination of CWD, if possible. Specific actions associated with active lethal surveillance are rapid reduction of the deer population to achieve the initial target deer density (31-35 deer per square mile) and a one-time reduction in population to a density consistent with the surrounding environment but not less than 10 deer per square mile.

NPS guidance suggests reducing population numbers as an appropriate management tool when population density is above that identified in park management plans

and/or the need to know CWD prevalence with a high degree of accuracy is necessary (NPS 2007c). Use of population reduction as a method for controlling disease in wildlife is based on the premise that infectious disease is a density-dependent process (Wobeser 1994). In captive situations, where animal density is high, the prevalence of CWD can be substantially elevated compared to that seen in free-ranging situations. The rate of disease transmission depends on factors such as contact rate among deer, total number of deer, and the number of infected deer (WDNR 2003). Thus it is hypothesized that increased animal density and increased animal-to-animal contact enhances the transmission and spread of CWD. Decreasing animal densities may decrease the transmission and incidence of the disease (NPS 2007c). The success of using population reduction, as a method for controlling disease, is directly related to early detection, response time, and the intensity, consistency, and duration of the control effort (WDNR 2003). This method may be more effective in managing isolated areas of disease than when disease is widely distributed. Therefore, removal efforts are considered most appropriate in situations focused on intensive control of smaller areas.

Rapid Reduction to Initial Target Deer Density

Alternative C (combined lethal actions) and Alternative D (combined lethal and nonlethal actions) in the plan/EIS involve the lethal removal of deer within the park boundary. Under these alternatives, active lethal surveillance would allow for a more rapid reduction of the deer population to achieve the initial deer density goal of 31-35 individuals per square mile. It is expected that this action would result in achieving this density twice as fast as population reduction would occur as described under Alternatives C and D in the plan/EIS. Achieving the initial deer density goal more quickly would minimize the probability of amplification within local deer populations and reduce the probability of spread to other deer populations. Data collected by NPS staff during spring deer counts indicate that the average deer density outside the park boundary between 2001 and 2008 was 29 deer per square mile. A deer density of 31-35 deer per square mile is considered appropriate as an initial target related to CWD, as well as in the plan/EIS, because it is consistent with deer density in the surrounding community and therefore, is not likely to create a refuge for deer or their associated diseases. This number also is consistent with recommendations in the scientific literature related to appropriate deer density to ensure adequate forest regeneration, which range from 10-40 deer per square mile.

Rapid reduction actions would be carried out as described under Alternative C (combined lethal actions) of the plan/EIS. However, testing for CWD would necessitate targeting the body rather than the head for removal efforts. With training, head shots may be taken and still preserve tissues needed for CWD testing (Cottrell, pers. comm. 2008b). Sharpshooting activities would initially target areas immediately surrounding the positive case to ensure removal of animals that have been in contact with CWD animals and potentially decrease local prevalence of CWD. Areas where deer movements across the park boundary into surrounding communities are frequent (southeastern, southwestern, and northwestern boundaries) and areas with high concentrations of deer (central and southwestern areas) may also be targeted for removal activities to reduce the probability of spread and promote elimination of the disease, if possible. During initial removal efforts, both male and female adult deer would be targeted due to the increased probability of infection in older animals and the spread potential posed by males. Additional removals in the first two years of the action would be based on available staffing and resources. This action is consistent with the Level 1 response described in Pennsylvania's CWD response plan (PCWDTF 2007).

To achieve the initial deer density goal of 31-35 deer per square mile in half the time proposed under Alternatives C and D, it is estimated that 650 deer would need to be removed in year 1 and 660 deer would need to be removed in year 2. This assumes the 2009 population size of 1,277 deer. The planned removals are outlined below.

- Years One and Two -- The population model estimated that between 650 and 660 deer would need to be removed annually for the first two years. This would reduce the deer population to an estimated 185 by the end of the second year (35 deer per square mile). This would result in the deer density goal being achieved.
- Subsequent Years - The population model estimated removal of 35-50 animals on an annual basis to maintain a population density of 31-35 deer per square mile.

One-time Reduction Action

In addition to the rapid reduction of the park's deer population to the target deer density, Zone 1 response could include a one-time reduction action to not less than 10 deer per square mile. Implementation of a one-time reduction of the deer population to not less than 10 deer per square mile would be based on the state's success in reducing deer populations within the CWD containment zone outside the park boundary. The NPS would not want to reduce the number of deer within the park to a density far below that outside the park because it may increase the likelihood of potentially infected deer repopulating the park from surrounding areas. However, the NPS also would not maintain a deer density significantly higher than that in surrounding communities, because that may increase the likelihood of disease amplification and spread into the park. To ensure that neither of these situations occurred, the park would work cooperatively with the state to address CWD as the state works to achieve a population density lower than 31-35 deer per square mile in areas surrounding the park. The one-time reduction action promotes the park's ability to provide CWD response commensurate with state actions in the areas surrounding the park and to contribute to CWD management efforts taking place at a broader scale. A deer density of 10 deer per square mile is considered appropriate as a lower limit for this action because it is consistent with recommendations in the scientific literature related to appropriate deer density to ensure adequate forest regeneration, which range from 10-40 deer per square mile. It is also consistent with the stated objective of the plan/EIS to maintain a deer population in the park. The action would be carried out as described above under rapid reduction to initial target deer density. Additional removals that are part of the one-time reduction would be based on available staffing and resources and may take more than one year to achieve.

All deer removed in the one-time reduction action would be tested for the presence of CWD, and samples from both the NPS and state would be pooled. It is assumed that an adequate number of samples would be available when samples collected within the park are combined with state samples to reach the state's desired detection/prevalence level without having a significant impact on the park deer population. If additional positive cases were not found within the CWD containment zone, the park would continue the monitoring described for Zone 2 above for a period of time consistent with current knowledge of the environmental persistence of CWD infectious agents and continue to contribute to the CWD monitoring efforts of the state.

If additional positive cases are detected, assuming the park has achieved its initial deer density goal or successfully implemented a one-time reduction for the purposes of disease response, the NPS would continue to contribute all deer obtained through opportunistic, targeted, and enhanced targeted surveillance, as well as those obtained

through deer management actions, to the state sampling effort. If Alternative B in the plan/EIS was implemented, live testing and culling of CWD-positive deer from the park would continue.

Relationship to White-tailed Deer Management Plan Alternatives

All deer management alternatives (A, B, C, and D) described in the plan/EIS include opportunistic, targeted, and enhanced targeted CWD surveillance. Surveillance actions described for Implementation Zones 2 and 3 would be implemented under any of the deer management alternatives, based on proximity of the nearest confirmed case of CWD to the park boundary and proximity of the park to a state-established containment zone. Live testing and culling of CWD-positive animals is included as a surveillance technique within Implementation Zone 1 under Alternative B (combined nonlethal actions) in the plan/EIS. Active lethal surveillance is included as a surveillance and response technique within Implementation Zone 1 under Alternative C (combined lethal actions) and Alternative D (combined lethal and nonlethal actions).

Active lethal CWD surveillance is only included in alternatives in the plan/EIS that include lethal reduction methods (Alternatives C and D). Alternative A (no-action) and Alternative B (combined nonlethal actions) described in the plan/EIS do not allow for lethal surveillance methods. Excluding active lethal surveillance may be an appropriate action if the threat of CWD was low and there were very limited resources to dedicate to disease recognition. The consequences of excluding active lethal surveillance under Alternative B include potentially failing to detect the disease if it is present, and the inability to work with neighboring land management agencies in assessing, understanding, and controlling the disease (NPS 2007c). However, to maintain consistency with public input, park staff felt it was important to provide one completely nonlethal management alternative outside of the no-action alternative.

Active lethal surveillance would be implemented in Zone 1 only if the combined lethal action (Alternative C) or combined lethal and nonlethal actions (Alternative D) is selected as the NPS preferred management alternative in the plan/EIS. If one of the lethal alternatives proposed in this plan/EIS is implemented (Alternative C or D) and CWD is detected within the park, the same lethal removal methods described in the alternative would be used to address CWD management. Details of implementation could change slightly as described above under Zone 1. If Alternative C is the preferred alternative, then population maintenance at the target deer density would continue to be implemented using lethal reduction methods such as sharpshooting and capture and euthanasia (if appropriate). If Alternative D is the preferred alternative, then population maintenance would be implemented using lethal reduction methods until CWD surveillance, conducted for a period of time consistent with current knowledge of the environmental persistence of CWD infectious agents, revealed no additional CWD-positive deer within the park. At that time, if an appropriate reproductive control agent is available, the park would implement reproductive control methods for population maintenance as described in the alternative.

Predator reintroduction (wolf predation as a stewardship tool) and depopulation were the only management options provided by NPS guidance (NPS 2007c) that were not considered in development of the CWD management approach at Valley Forge NHP. Predator reintroduction was considered but dismissed as a deer management strategy in the plan/EIS and thus was not considered an appropriate

tool for CWD management. Depopulation was dismissed because it is inconsistent with the stated objective of the plan/EIS to maintain a white-tailed deer population within the park. A summary of CWD management actions associated with deer management alternatives described in the plan/EIS is provided in Table C-4.

Table C-4 Relationship between CWD Surveillance and Response Actions and Deer Management Strategies Described in the Plan/EIS

Alternative	Opportunistic Surveillance ^a	Targeted Surveillance ^a	Enhanced Targeted Surveillance	Test and Cull	Active Lethal Surveillance	Coordination with State Agencies
Alternative A (No Action)	X	X	X			X
Alternative B (Combined Nonlethal Actions)	X	X	X	X		X
Alternative C (Combined Lethal Actions)	X	X	X		X	X
Alternative D (Combined Lethal and Nonlethal Actions)	X	X	X		X	X
Implementation Zone	Zone 3	Zone 2	Zone 1			All actions, across implementation zones, would be closely coordinated with the PGC and PDA due to the scale of management identified as necessary to address CWD (minimum 79 square miles) relative to park size (5.3 square miles)
Implementation Threshold Description	Confirmed case of CWD more than 60 miles from park boundary	Confirmed case of CWD within 60 miles but greater than 5 miles from park boundary; park does not fall within a state containment zone	Confirmed case of CWD within 5 miles of park boundary or park falls within a state-established CWD containment zone			

^a Actions are cumulative. Therefore, once opportunistic sampling is initiated in Zone 3, it continues to be implemented in Zones 2 and 1. Once targeted surveillance is implemented in Zone 2, it continues to be implemented in Zone 3.

Disposal

Recommendations for disposal of CWD-infected deer are based upon guidance provided through the NPS Public Health Program (NPS 2006), the Pennsylvania CWD response plan (PCWDTF 2008a), and recommendations provided by the CWD science team. Currently, no scientific evidence exists linking the consumption of meat from deer or elk in areas with historic CWD to human disease. However, due to the lack of knowledge surrounding CWD disease ecology, proposed disposal options preclude donation of CWD-positive deer for human consumption.

Implementation Zone 3

As long as there were no confirmed cases of CWD within a 60-mile radius of the park, carcass disposal would continue as described under all deer management alternatives in the plan/EIS. These methods include landfilling, surface disposal, and donation of meat to food pantries.

Implementation Zones 2 and 1

If the presence of CWD is confirmed within Implementation Zones 2 or 1, then carcass disposal would occur in accordance with NPS Public Health Program guidelines for donation of meat from an “Area Affected by CWD” for the purpose of human consumption (NPS 2006). These guidelines require that those persons actually consuming the meat be fully informed and take full responsibility for any long-term unanticipated effects of eating meat from animals coming from a CWD-affected area. Donation of meat to food pantries would likely prohibit the park from being able to obtain informed consent from final consumers. This precludes the park from considering this as a disposal option within Implementation Zone 2. If a CWD-positive deer is confirmed within Zone 1, these guidelines clearly preclude the donation of meat to food pantries, soup kitchens, or any entity that intends to redistribute the meat (NPS 2006).

Within Implementation Zones 2 and 1, disposal of carcasses would follow guidelines provided by the Pennsylvania CWD response plan (PCWDTF 2007). It is acknowledged that guidelines provided by the commonwealth’s plan are considered preliminary and are expected to be more fully developed over time. Developing science is expected to dictate the disposal of CWD-positive deer in Pennsylvania. Park staff would remain in close contact with appropriate state agencies regarding disposal of CWD-positive deer and integration of the park and state approach to carcass disposal.

Landfilling

The Pennsylvania CWD response plan (PCWDTF 2007) identifies three disposal methods appropriate for CWD-positive carcasses: landfilling, incineration, and tissue digestion. These methods are consistent with recommendations provided by the CWD science team. Disposal of carcasses at a landfill is preferred, with landfilling occurring at a site which meets modern sanitary landfill standards, such as engineered liners, caps, and leachate and gas collection systems. This disposal option is suggested as the most cost effective and most capable of handling large numbers of animals. A disadvantage to landfilling is while it is generally considered effective at containing the prions, this method of disposal does not immediately destroy the prion. It is expected that the prions in the landfill would degrade over time, but it is not known how long it would take to completely inactivate all prions (PCWDTF 2007).

A standard operating procedure would be developed to address procedures such as delivery, covering, and placement in relation to the leachate collection system. Currently, the state has not initiated discussions with landfill operators regarding disposal of CWD-positive deer. If landfills are unwilling to accept CWD-positive deer, then it would be necessary to store carcasses until test results were available. Only carcasses that test negative for CWD would be disposed of via landfilling.

Storage of carcasses would occur through use of a refrigerated box car or truck, capable of storing at least 100 deer for up to 3 months. The box car or truck would be located within a secured area at the park maintenance yard. Under all

management alternatives in the plan/EIS, deer carcasses would be tagged with a unique identifying mark to facilitate tracking of test results. Under alternatives that include lethal removal (Alternatives C and D), deer would be processed and stored in identified lots (e.g., 10 deer per lot) to maximize efficiency. If test results revealed a CWD-positive animal, the entire lot to which it belonged would be disposed of in an approved manner. Processing areas and tools would be decontaminated between lots to prevent potential CWD contamination among lots. Under other alternatives, where large numbers of carcasses would not be expected, processing areas and tools would be decontaminated as appropriate.

Incineration

Carcasses that test positive for CWD may be disposed of by incineration through the Pennsylvania Animal Diagnostic Laboratory System (PADLS). The European Union recommends temperatures of at least 1,562 degrees Fahrenheit (850 Celsius) be maintained for at least two seconds to denature the CWD prion and incinerate carcasses (PCWDTF 2007). The PADLS incineration facility uses a controlled furnace, which is equipped with a primary and secondary combustion chamber. This equipment is similar to that found in other pathological incinerators and animal crematories. The only potential disadvantages of incineration are that this method is relatively expensive and may have a limited surge capacity. However, it can meet the temperature criteria described above (PCWDTF 2007). Should additional incineration capacity be needed, the Pennsylvania Department of Environmental Protection and the PGC would be consulted for additional incineration sites. Ashes associated with incineration would be disposed of by PADLS or via landfilling.

Alkaline Digestion

The use of tissue digestion as a disposal method for CWD-positive deer may be considered in the future. Although commonly called a digester, this method of carcass disposal is based on alkaline hydrolysis. The basis of this technology is the use of sodium or potassium hydroxide solutions under pressure and at elevated temperatures (approximately 150 degrees Celsius) to hydrolyze proteins into peptides and amino acids. As TSEs are believed to be caused by an abnormal prion protein, this technology is ideally suited for inactivation and disposal of infected animals and tissues derived from them. Currently, an approved digestion facility does not exist within the Commonwealth of Pennsylvania, although construction of one is being considered at PADLS, New Bolton Center.

Minimizing Environmental Contamination

It is unlikely that CWD prions can be completely removed from the landscape once introduced. However, actions to minimize environmental contamination can be taken. At Valley Forge NHP, these activities would remain consistent with the constantly improving state of knowledge on this subject. Within Zone 1, the following additional activities would occur under all deer management alternatives in the plan/EIS to minimize environmental contamination during carcass handling and disposal:

- Surface disposal would be eliminated as a carcass disposal method.
- Temporary storage areas for carcasses would be impervious.

- Deer carcasses obtained through lethal removal actions (Alternatives C and D in the plan/EIS) would not be gutted and would be removed from the landscape immediately.
- Deer carcasses obtained through other means (e.g., deer-vehicle collisions) would be removed from the landscape as soon as possible (many are unreported and thus may not be noticed immediately).
- Baiting as a tool for facilitating delivery of reproductive control agents under Alternative B or lethal removal actions under Alternatives C and D in the plan/EIS would be limited (reducing fecal concentration on the landscape).
- Handling of deer for the purpose of obtaining samples for CWD testing would occur on plastic tarps or other impervious surface to minimize the transfer of body fluids onto the ground.

Implementation Costs

The following tables (C-5, C-6, C-7, and C-8) summarize the costs associated with implementation of the CWD response plan for Valley Forge NHP. The costs are broken down by implementation zone under each deer management alternative.

Table C-5 Alternative A: CWD Response Costs by CWD Implementation Zones

Action	Implementation Zone 3		Implementation Zone 2		Implementation Zone 1	
Opportunistic Surveillance	NPS Staff Time to Obtain Tissue Samples; 51 deer per year x 1hr/deer x \$20/hr	\$1,020	NPS Staff Time to Obtain Tissue Samples; 75 deer per year x 1hr/deer x \$20/hr	\$1,500	NPS Staff Time to Obtain Tissue Samples; 75 deer per year x 1hr/deer x \$20/hr	\$1,500
Targeted Surveillance			NPS Staff Time: Conduct Annual Training; 16 hrs @ \$35/hr	\$560	NPS Staff Time: Conduct Annual Training; 16 hrs @ \$35/hr	\$560
			NPS Staff Time: Lethal Removal of Deer Exhibiting Clinical Signs of CWD and Obtaining Tissue Samples; 15 deer per year @ 3 hrs/deer x \$35/hr	\$1,575	NPS Staff Time: Lethal Removal of Deer Exhibiting Clinical Signs of CWD and Obtaining Tissue Samples; 25 deer per year @ 3 hrs/deer x \$35/hr	\$2,625
			Equipment: 20 pairs of binoculars @ \$80 each; Likely purchased twice during life of plan (YR 1, YR 8)	\$3,200 total cost (15 yrs)	Equipment: 20 pairs of binoculars @ \$80 each; Likely purchased twice during life of plan (YR 1, YR 8)	\$3,200 total cost (15 yrs)
			Set-up Cost YR 1: Rifle and Ammunition	\$1,000	Set-up Cost YR 1: Rifle and Ammunition	\$1,000
Enhanced Targeted Surveillance						
Dedicated NPS staff time					NPS Staff Time: 1 hr/day or 5 hrs/week x 26 weeks x \$20/hr	\$2,600
Dedicated volunteer time *Cost based on NPS staff time needed to organize and provide oversight of volunteer activities.					Volunteer Time: 1 hr/day or 5 hrs/week x 26 weeks (Cost based on NPS Staff Time to organize and provide oversight for volunteers @ 1 hr/week X 26 weeks x \$20/hr)	\$520
CWD Testing and Testing Supplies *It is assumed that NPS-BRMD will provide CWD testing at no charge throughout the life of this plan.	Testing conducted at no cost by NPS-BRMD for at least first 5 years; includes mailing costs	\$0	Testing conducted at no cost by NPS-BRMD for at least first 5 years; includes mailing costs	\$0	Testing conducted at no cost by NPS-BRMD for at least first 5 years; includes mailing costs	\$0
	Purchase of testing supplies every 3 years (YR 3, YR 6, YR 9, and YR 12) @ \$1500 to \$3,000 per purchase	\$6,000 total cost (15 yrs)	Purchase of testing supplies every 3 years (YR 3, YR 6, YR 9, and YR 12) @ \$1500 to \$3,000 per purchase	\$12,000 total cost (15 yrs)	Purchase of testing supplies every 3 years (YR 3, YR 6, YR 9, and YR 12) @ \$1500 to \$3,000 per purchase	\$12,000 total cost (15 yrs)
Disposal of CWD-positive Carcasses *Assumes relatively high prevalence (10%) and increased probability of detecting CWD in road-killed deer. *Assumes average weight of deer is 100 lbs. *Costs included under implementation Zone 3 only because it is at this point that CWD-positive deer are assumed to be in the park. *Due to uncertainties regarding landfilling of CWD-positive carcasses costs are based on incineration (\$1-\$2.50/lb).					10 carcasses per year @ 100 lbs/carcass X \$1-\$2.50/lb for incineration; \$100-\$250/carcass	\$1,000 -\$2,500
Alternative A Recurring Annual CWD Costs		\$1,020		\$3,635		\$8,805 - \$10,305
Alternative A 15-YR CWD Costs (includes one-time/set-up costs, periodic activities)		\$21,300		\$70,725		\$148,275 - \$170,775

Table C-6 Alternative B: CWD Response Costs by CWD Implementation Zones						
Action	Implementation Zone 3		Implementation Zone 2		Implementation Zone 1	
CWD Costs Associated with Alternative A, plus:						
Test and Cull CWD-Positive Deer					NPS Staff Time to Obtain Tissue Samples via Tonsillar Biopsy; Handling and Shipping; Cost would depend on number of deer treated and current available technology. Assume 90% of does (574) treated each year, beginning at Year 1. 1 hr per deer x 574 deer x \$35/hr	\$20,090
CWD Testing and Testing Supplies *It is assumed that NPS-BRMD will provide CWD testing at no charge throughout the life of this plan.					Conducted at no cost by NPS-BRMD for at least first 5 years.	\$0
					Additional \$2,000 per purchase for CWD testing supplies every 3 years (YR 3, YR 6, YR 9, and YR 12)	\$8,000 total over 15 years
Disposal of CWD-positive Carcasses *Assumes relatively high prevalence (10%) and increased probability of detecting CWD in road-killed deer. *Assumes average weight of deer is 100 lbs. *Costs included under implementation Zone 3 only because it is at this point that CWD-positive deer are assumed to be in the park. *Due to uncertainties regarding landfilling of CWD-positive carcasses costs are based on incineration (\$1-\$2.50/lb).					Additional 35 carcasses per year than proposed under Alternative A @ 100 lbs/carcass X \$1-\$2.50/lb for incineration; \$100-\$250/carcass	\$3,500 -\$8,750
Alternative A Recurring Annual Costs		\$1,020		\$3,635		\$8,805 - \$10,305
Additional Recurring Annual Costs Under Alternative B		\$0		\$0		\$23,590 - \$28,840
Alternative B Recurring Annual CWD Costs		\$1,020		\$3,635		\$32,395 - \$39,145
Alternative A 15-year Costs		\$21,300		\$70,725		\$148,275 - \$170,775
Alternative B 15-year CWD Costs (includes one-time/set-up costs, periodic activities)		\$21,300		\$70,725		\$502,125 - \$603,375

Table C-7 Alternative C: CWD Response Costs by CWD Implementation Zones

Action	Implementation Zone 3		Implementation Zone 2		Implementation Zone 1	
CWD Costs Associated with Alternative A, plus:						
Active Lethal CWD Surveillance						
Rapid Reduction to Target Deer Density: Sharpshooting					Years 1: 150 additional deer removed than proposed under Alt C (\$200/deer)	\$30,000
					Years 2: 75 additional deer removed than proposed under Alt C (\$200/deer)	\$15,000
					Years 3-15: 35-40 deer removed annually (\$400/deer); No additional costs to those proposed under Alt C	
One-Time Reduction to Not Less Than 10 Deer Per Square Mile *Costs based on number of deer removed to go from 35 deer per square mile to 10 deer per square mile and represent costs in addition to those costs proposed under Alternative C. *Assumes initial target deer density has been achieved and initial population size is 185 deer. *Expected to take two years to achieve 10 deer per square mile.					Year 1: 40 additional deer removed than proposed under Alt C (Years 5+) (\$400/deer)	\$16,000
					Year 2: 30 additional deer removed than proposed under Alt C (Years 5+) (\$400/deer)	\$12,000
					Years 3-15: 10-20 deer removed annually (\$400/deer); No additional costs to those proposed under Alt C	
Carcass Storage					Six month lease of 32-48 foot refrigerated storage trailer and gas; @\$1,400 per month; Estimated for 5 years	\$42,000
Disposal of CWD-positive Carcasses *Assumes relatively low prevalence (<1%). *Assumes average weight of deer is 100 lbs. *Costs included under implementation Zone 3 only because it is at this point that CWD-positive deer are assumed to be in the park. *Due to uncertainties regarding landfilling of CWD-positive carcasses costs are based on incineration (\$1-\$2.50/lb).					Additional 10 carcasses per year than proposed under Alternative A @ 100 lbs/carcass X \$1-\$2.50/lb for incineration; \$100-\$250/carcass	\$1,000 - \$2,500

Table C-7 Alternative C: CWD Response Costs by CWD Implementation Zones						
Action	Implementation Zone 3		Implementation Zone 2		Implementation Zone 1	
CWD Testing and Testing Supplies *It is assumed that NPS-BRMD will provide CWD testing at no charge throughout the life of this plan.					No additional costs for supplies and equipment.	
					NPS Staff Time to Obtain CWD Samples; Mark individual animals; Handling and Shipping; Cost would depend on number of deer treated and current available technology. Cost based on 50 deer x 1 hr/deer x \$35/hr	\$1,750
Alternative A Recurring Annual Costs		\$1,020		\$3,635		\$8,805 - \$10,305
Additional Recurring Annual Costs		\$0		\$0		\$2,750 - \$4,250
Alternative C Recurring Annual CWD Costs		\$1,020		\$3,635		\$11,555 - \$14,555
Alternative A 15-YR Costs		\$21,300		\$70,725		\$148,275 - \$170,775
Alternative C 15-Yr CWD Costs (includes one-time/set-up costs, periodic activities)		\$21,300		\$70,725		\$436,600 - \$504,100

Table C-8 Alternative D: CWD Response Costs by CWD Implementation Zones						
Actions	Implementation Zone 3		Implementation Zone 2		Implementation Zone 3	
Same as CWD Costs Associated with Alternative C						
Alternative D Recurring Annual CWD Costs		\$1,020		\$3,635		\$11,555 - \$14,555
Alternative D 15-Yr Costs (includes one-time/set-up costs, periodic activities)		\$21,300		\$70,725		\$436,600 - \$504,100

Selected Bibliography

Alaimo Group

- 2007 *Chester County Municipal Waste Management Plan, Chester County, Pennsylvania.* Prepared by the Alaimo Group for the County of Chester, The Chester County Health Department, and Bureau of Environmental Health Protection. Chester County, Pennsylvania.

Conner, M. M., C. E. Krumm, and M. W. Miller

- 2005 "Increasing the Efficacy of Chronic Wasting Disease Detection via Selective and Targeted Sampling." Paper presented at the Second International Chronic Wasting Disease Symposium, Madison, WI, July 12–14, 2005.

Cottrell, W.

- 2008a E-mail message from Walter Cottrell, Wildlife Veterinarian, PGC to Kristina Heister, Valley Forge NHP Natural Resource Manager, May 15, 2008, regarding deer imported from CWD affected areas.
- 2008b E-mail message from Walter Cottrell, Wildlife Veterinarian, PGC to Kristina Heister, Valley Forge NHP Natural Resource Manager, August 22, 2008, regarding comments on version 4 of the CWD Response Plan.

CWD Alliance

- 2008 *Why Are We Concerned About CWD?* Available on the Internet at <<http://www.cwd-info.org/index.php>>. Accessed on May 6, 2008.

Joly, D. O., C. A. Ribic, J. A. Langenberg, K. Beheler, C. A. Batha, B. J. Dhuey, R. E. Rolley, G. Bartelt, T. R. Van Deelen, and M. D. Samuel

- 2003 "Chronic Wasting Disease in Free-ranging Wisconsin White-tailed Deer." *Emerging Infectious Diseases* 9:599–601.

Joly, D. O., M. D. Samuel, J. A. Langenberg, J. A. Blanchong, C. A. Batha, R. E. Rolley, D. P. Keane, and C. A. Ribic

- 2006 "Spatial Epidemiology of Chronic Wasting Disease in Wisconsin White-tailed Deer." *Journal of Wildlife Diseases* 42(3): 578-88.

Long, E. S., D. R. Diefenbach, C. S. Rosenberry, B. D. Wallingford, and M. D. Grund

- 2005 "Forest Cover Influences Dispersal Distance of White-tailed Deer." *Journal of Mammalogy* 86 (3): 623-29.

Lovallo, M. J., and W. M. Tzilkowski

- 2003 *Abundance of White-tailed Deer (Odocoileus virginianus) within Valley Forge National Historical Park and Movements Related to Surrounding Private Lands.* U.S. Department of the Interior, National Park Service, Technical Report NPS/NERCHAL/NRTR-03/091.

Miller, M. W., E. S. Williams, C. W. McCarty, T. R. Spraker, T. J. Kreeger, C. T. Larsen, and E.T. Thorne

- 2000 "Epizootiology of Chronic Wasting Disease in Free-ranging Cervids in Colorado and Wyoming." *Journal of Wildlife Diseases* 36:676-90.

Multi-agency Task Force

- 2002 *Plan for Assisting States, Federal Agencies, and Tribes in Managing Chronic Wasting Disease in Wild and Captive Cervids.* Available on the Internet at <http://www.cwd-info.org/docs/CWD_National_CWD_Plan.doc>.

National Park Service (NPS)

- 2002 “Director’s CWD Guidance Memorandum.” July 26.
- 2006 *Elk and Deer Meat from Areas Affected by Chronic Wasting Disease: A Guide to Donation for Human Consumption.* Washington, DC: National Park Service Public Health Program.
- 2007a *Antietam and Monocacy National Battlefields Chronic Wasting Disease/Detection and Initial Response Plan and Environmental Assessment: Science Team Summary, Final Report.*
- 2007b *Chronic Wasting Disease Surveillance Guidance for Valley Forge National Historical Park, PA.* Valley Forge National Historical Park, King of Prussia, PA. In draft form.
- 2007c *A National Park Service Manager’s Reference Notebook to Understanding Chronic Wasting Disease. Version 4.* Available on the Internet at <http://www1.nrintra.nps.gov/brmd/nativespecies/wildlifehealth/Chronic_Wasting/CWD_notebook_version%204%20_7_27_07_.pdf>.
- 2008 “CWD Science Team Recommendations.” Summary Memorandum for Valley Forge National Historical Park. July 7, 2008.

Pennsylvania Chronic Wasting Disease Task Force (PCWDTF)

- 2007 *Pennsylvania’s Chronic Wasting Disease Response Plan.* May 2007. Harrisburg, PA.
- 2008 *Chronic Wasting Disease Update, 8/14/2008.* Available on the Internet at <<http://www.pgc.state.pa.us/pgc/cwp/view.asp?a=458&q=163873>>.

Powers, J.

- 2008 E-mail message from Jenny Powers, Wildlife Veterinarian, Biological Resource Management Division, National Park Service to Kristina Heister, Valley Forge NHP Natural Resource Manager, June 27, 2008, regarding CWD response.

Samuel, M. D., D. O. Joly, M. A. Wild, S. D. Wright, D. L. Otis, R. W. Werge, and M. W. Miller

- 2003 *Surveillance Strategies for Detecting Chronic Wasting Disease in Free-ranging Deer and Elk.* National Wildlife Health Center, United States Geological Survey, Madison, Wisconsin, USA. 41pp.

U.S. Department of Agriculture (USDA)

- 2006 *Final Ruling on Chronic Wasting Disease.* Animal and Plant Health Inspection Service (APHIS), U.S. Department of Agriculture.

Wisconsin Department of Natural Resources (WDNR)

- 2003 *Environmental Impact Statement on Rules to Eradicate Chronic Wasting Disease from Wisconsin's Free-Ranging White-tailed Deer Herd*. Available on the Internet at <<http://www.dnr.state.wi.us/org/land/wildlife/Health/issues/Cwd/doc/eis.htm>>.

Wobeser, G. A.

- 1994 *Investigation and management of disease in wild animals*. New York: Plenum Press.

Wolfe, L. L., M. W. Miller, and E. S. Williams

- 2004 "Feasibility of "test-and-cull" for managing chronic wasting disease in urban mule deer." *Wildlife Society Bulletin* 32:500-505.

Wolfe, L. L., T. R. Spraker, L. Gonzalez, M. P. Dagleish, T. M. Sirochman, J. C. Brown, M. Jeffrey, and M. W. Miller

- 2007 "PrPCWD in Rectal Lymphoid Tissue of Deer (*Odocoileus* spp.). *Journal of General Virology* 88:2078-82.

This page intentionally left blank.

Appendix D: Detailed Cost Estimates

Alternative A: No-action

The costs associated with Alternative A would primarily cover deer and vegetation monitoring, CWD surveillance (opportunistic, targeted, and enhanced targeted), maintenance of small fenced areas (e.g. riparian buffer fencing), and removal of deer from roadways. These estimates are considered minimum costs and do not include inflation over time. Costs assume knowledge of existing park activities and experience of park staff. Costs associated with CWD response vary significantly based on the distance of a confirmed case of CWD from the park boundary and location of the park relative to a state-established CWD containment zone. Recurring annual costs associated with Alternative A are estimated to total between \$14,828 and \$32,567. Costs over the life of the plan (15 years) are estimated to total between \$253,482 and \$403,257.

Cost over the life of the plan includes one-time and periodic costs (e.g., start-up costs, costs incurred every three years) in addition to the sum of annual recurring costs over 15 years.

Table D-1 provides a detailed breakdown of the costs associated with Alternative A.

Table D-1 Cost Estimate for Alternative A: No-action			
Action	Assumptions	Estimated Recurring Annual Cost	Estimated Cost for the 15-year Planning Period
Valley Forge NHP Vegetation Monitoring (Carried out every 5 years)		\$384 - \$8,838	\$31,122
	30 days field work at NPS salary of \$3,454/month (3 times over life of plan)	\$3,454 (once every 5 years)	\$10,362
	30 days field work for Botanist Assistant at \$2,500/month (3 times over live of plan)	\$2,500 (once every 5 years)	\$7,500
	Data Analysis Report (3 times over life of plan)	\$2,500 (once every 5 years)	\$7,500
	Annual exclosure check consists of 32 hours of a volunteer's time at \$12/hour	\$384	\$5,760

Table D-1 Cost Estimate for Alternative A: No-action (continued)

Action	Assumptions	Estimated Recurring Annual Cost	Estimated Cost for the 15-year Planning Period
NPS I&M Vegetation Monitoring^a	Carried out every year. Only a select number of plots are monitored each year. Over a five year period, all of the plots are monitored. Costs and labor are covered by the I&M program.	\$0	\$0
Deer Population Monitoring		\$1,702	\$25,530
Fall Spotlight Counts	12 hours at NPS salary of \$35.27/hour	\$423	\$6,345
	12 hours of a volunteer's time at \$12/hour	\$144	\$2,160
Spring Compartment Counts	7.5 hours at NPS salary of \$35.27/hour	\$265	\$3,975
	7.5 hours at NPS salary of \$20/hour	\$150	\$2,250
	7.5 hours of 8 volunteers' time at \$12/hour	\$720	\$10,800
Small Fenced Areas		\$6,000	\$90,000
	325 volunteer hours at \$12/hour to annually maintain riparian buffer fencing	\$3,900	\$58,500
	80 hours of NPS staff time at \$20/hour	\$1,600	\$24,000
	Supplies and equipment	\$500	\$7,500
	<i>Viburnum nudum</i> fencing is checked on during other tasks	\$0	\$0
Roadkill Removal		\$3,511	\$52,665
	40 hours of NPS staff time to pull deer off road and/or euthanize.	\$1,411	\$21,165
	Contractor removes and disposes of dead deer at \$35/deer (via landfilling)	\$2,100	\$31,500

Table D-1 Cost Estimate for Alternative A: No-action (continued)

Action	Assumptions	Estimated Recurring Annual Cost	Estimated Cost for the 15-year Planning Period
Public Education		\$2,211	\$33,165
	40 hours of NPS staff time at \$20/hour	\$800	\$12,000
	40 hours of NPS staff time at \$35.27/hour	\$1,411	\$21,165
CWD Response ^b		\$1,020 - \$10,305	\$21,300 - \$170,775
Opportunistic Surveillance	Implementation Zone 3	\$1,020	\$21,300
Add Targeted Surveillance	Implementation Zone 2	\$3,635	\$70,725
Add Enhanced Targeted Surveillance	Implementation Zone 1	\$8,805 - \$10,305	\$148,275 - \$170,775
Total Costs		\$14,828 - \$32,567^c	\$253,482 - \$403,257^c

Note: Cost over the life of the plan includes one-time and periodic costs (e.g., start-up costs, costs incurred every five years) in addition to the sum of annual recurring costs over 15 years.

- a The costs of the I&M monitoring are covered by the program budget and are not assumed by Valley Forge NHP.
- b Refer to Appendix C: CWD Response Plan for a full explanation of costs associated with CWD surveillance. Costs associated with surveillance activities include supplies and equipment and disposal of CWD-positive carcasses under Implementation Zone 1.
- c Upper range of total costs excludes \$2,100 costs for contractor disposal of road-killed deer in Implementation Zones 2 and 1.

Alternative B: Combined Nonlethal Actions

Costs of implementing Alternative B would include the same costs described under Alternative A (vegetation and deer population monitoring, small fenced areas, roadkill removal, public education, and CWD response), plus costs of constructing, monitoring, and maintaining rotational fencing, implementing reproductive controls and fertility monitoring, and initiating testing and culling of CWD-positive deer, if CWD is confirmed within five miles of the park boundary or the park falls within a state-established CWD containment zone. The overall cost of implementing Alternative B would depend on factors such as the number of deer treated, methods used, number of personnel, monitoring costs, and the distance of a confirmed case of CWD from the park boundary (Implementation Zone 3, 2, or 1). Recurring annual costs associated with Alternative B are estimated between \$246,103 and \$1,163,907. Costs over the life of the plan (15 years) are estimated between \$8,056,657 and \$14,025,682.

Cost over the life of the plan includes one-time and periodic costs (e.g., start-up costs, costs incurred every three years) in addition to the sum of annual recurring costs over 15 years.

The following text provides an explanation of the costs included in Alternative B, and Table D-2 provides a summary of the detailed costs.

Rotational Fencing

Rotational fencing would be a minimum of 8-10 feet tall and comprise woven wire. It is estimated that it would take up to 150 working days to construct all fenced areas. Details related to fence installation are expected to vary widely based on factors such as topography, geologic substrate, access, and presence of archeological resources. A cost estimate for fencing was generated using the standardized government Cost Estimating Software System CESS (NPS 2008b) program and is considered to be a Class C estimate. Class C indicates a conceptual cost estimate based on square foot cost (or unit cost) of similar construction. The NPS CESS software calculates labor and materials costs based on the local area and the average difficulty to install wire mesh in southeastern Pennsylvania based on 2008 pricing. The following cost factors are accounted for in the estimate: park location, design contingency, historic preservation factor, general and administrative costs, overhead, and profit. Fence design and installation cost is estimated between \$30 (materials and labor only) and \$45 per linear foot. Total cost to install rotational fencing across 10%-15% of the forested area of the park would range from \$1,403,550 to \$2,105,325.

Most likely, fenced areas would be relocated every 15 to 20 years. Therefore, relocation costs are not included in this plan. However, it is estimated that future costs to relocate up to 15 fenced areas are 75% of the original cost. Maintenance costs could be substantial due to the remoteness of some fenced sites and the presence of very rocky soils.

Labor to inspect and maintain fencing is estimated at approximately one person per day for each enclosure annually, assuming four scheduled visits per year. Using an average rate of \$160 per day and 15 days to cover all of the enclosures, the annual maintenance cost would be \$2,400 for labor. An additional \$8,000 per year would be needed for maintenance materials and additional visits due to inclement weather. The additional vegetation monitoring cost for three enclosures per year would be approximately \$1,500 (based on annual monitoring costs used in Alternative A).

Reproductive Control

A study in New York, one of the few conducted on a suburban, free-ranging deer population, estimated that the minimal annual time commitment per deer for reproductive control (using PZP) was approximately 20 hours, costing in the range of \$450 to \$1,000 per deer (Rudolph et al. 2000). At Cleveland Metro Parks, labor cost approximately \$450 per deer, and vaccines and equipment were approximately \$450 per deer (DeNicola, pers. comm. 2004). Vaccine trials in Connecticut cost \$1,128 per deer for 30 deer over 2 years, with 64% of the cost going to labor (Latham et al. 2005).

At Valley Forge NHP, costs per deer would include the reproductive control and anesthetic agents, labor and equipment, and potentially bait piles. The estimated cost is \$200 per dose of Leuprolide. Costs are based on Leuprolide because evaluation of existing fertility control agents revealed that Leuprolide met more of the criteria than other agents. Additional handling and processing costs associated with delivering the treatment also would apply. Based on the high number of deer that would need to be treated and potential difficulties working within a suburban setting (visitation, restrictions on timing) at Valley Forge NHP, the expected costs for implementing reproductive controls would range from \$1,000 to \$1,900 per deer. Costs could vary based on the number of deer that need to be treated, improved technology, market demand, and/or changes in pricing (APHIS, pers. comm. 2008).

Current monitoring carried out in the spring and fall would continue to be the primary method of measuring the success of this alternative. Additional monitoring to document reproductive control success (pregnancy rate, reproductive rate) would be implemented and would require approximately 30 minutes of additional handling for each female deer carcass documented within the park. It would be expected that as the number of does treated with a reproductive control agent increased over time the percent of pregnant does would decrease. Data on reproductive rates also would be used to define the existing population.

CWD Response Plan

Costs associated with CWD response would only be incurred if a confirmed case of CWD were documented within 5 miles of the park boundary or the park fell within a state-established CWD containment zone (Implementation Zone 1). Costs would vary primarily based on when this CWD response threshold is reached and how many deer had already been treated with a reproductive control agent and marked initially at the time of the response.

Tonsillar biopsy would be conducted during initial treatment of a reproductive control agent and permanent marking of deer. No additional costs associated with capture and anesthesia are expected. For the purposes of this plan costs are estimated based on tonsillar biopsy of 460 deer and assumes implementation simultaneously with reproductive control.

CWD testing would be conducted by the NPS-BRMD at no cost for at least the first five years. It is assumed that this service would continue to be provided through the life of the plan. If NPS-BRMD is no longer able to provide testing services free of charge, an additional \$5 per test would be incurred. An additional hour of labor per deer would be required to obtain, process, and mail tissue samples. Most materials required to conduct tissue biopsies were purchased for the park by NPS-BRMD in 2008. Additional materials may be required for processing tonsillar biopsy samples and would be purchased approximately every three years throughout the life of this plan (e.g. disinfectant, plastic tarps).

Disposal costs for CWD-positive deer represent cost per pound for incineration (\$1 to \$2.50 per pound). These costs would only be incurred under Implementation Zone 1, where it is assumed that CWD is in the park. Costs were based on incineration due to the uncertainties surrounding the use of landfills for disposal of CWD-positive deer. Estimates assume an average weight of 100 pounds per deer.

Table D-2 Cost Estimate for Alternative B: Combined Nonlethal Actions

Action	Assumptions	Estimated Recurring Annual Cost	Estimated Cost for the 15-Year Planning Period
Same actions as Alternative A (excluding CWD response)	See Alternative A	\$13,808 - \$22,262	\$232,482
Rotational Fencing		\$10,400	\$1,559,550 - \$2,261,325
Construction	10-15 fenced areas (estimated 46,700 linear feet @ \$30-\$45/linear foot)	\$0	\$1,403,550 - \$2,105,325 (first year only)
Maintenance	Equipment and materials for repairs	\$8,000	\$120,000
Labor	1 person-day/ enclosure/year, with up to 4 visits per year for maintenance actions @\$20/hr	\$2,400	\$36,000
Vegetation Monitoring	Data collection and analysis of 3 plots within fenced areas each year, completing all 15 plots in 5 years	\$1,500	\$22,500
Reproductive Control	Cost would depend on number of deer treated and current available technology. Assume 90% of does (574) treated each year, beginning at Year 1; \$1,000-\$1,900/deer x 574 does	Years 1-5: \$574,000 - \$1,090,600 Years 6-10: \$386,000 - \$733,400 Years 11+: \$188,000 - \$357,200	\$5,740,000 - \$10,906,000
CWD Response^b		\$32,395 - \$39,145	\$502,125 - \$603,375
Test and Cull CWD-Positive Deer	Labor, Carcass Disposal	\$23,590 - \$28,840	\$353,850 - \$432,600
	Supplies and Equipment	\$0	\$8,000
Total Costs		\$246,103 - \$1,163,907	\$8,056,657 - \$14,025,682

Note: Cost over the life of the plan includes one-time and periodic costs (e.g., start-up costs, costs incurred every five years) in addition to the sum of annual recurring costs over 15 years.

a Cost over the life of the plan for reproductive control is based on a decrease in population size of 33% by year 5 and a decrease of 67% by year 10.

b Refer to Appendix C: CWD Response Plan for a full explanation of costs associated with CWD surveillance. CWD Response costs represent the sum of costs incurred under Alternative A and additional costs incurred under Alternative B.

Alternative C: Combined Lethal Actions

Costs of implementing Alternative C would include the costs described under Alternative A (vegetation and deer population monitoring, small fenced areas, roadkill removal, public education, and CWD response), plus the cost of sharpshooting, capture/euthanasia, and initiation of active lethal CWD surveillance if CWD were confirmed within five miles of the park boundary or the park fell within a state-established CWD containment zone. The overall cost of implementing Alternative C would depend on factors such as the number of deer removed, methods used, personnel or contractor costs, and the distance of a confirmed case of CWD from the park boundary (Implementation Zone 3, 2, or 1). Recurring annual costs associated with Alternative C are estimated between \$56,113 and \$176,817. Costs over the life of the plan (15 years) are estimated between \$1,461,332 and \$1,528,832.

Cost over the life of the plan includes one-time and periodic costs (e.g., start-up costs, costs incurred every three years) in addition to the sum of annual recurring costs over 15 years.

Estimated costs for Alternative C are discussed below and summarized in Table D-3.

Sharpshooting

Factors affecting the final cost of implementing this alternative include deer density, number of deer to be removed, ease of access to deer, number, location, and success of bait stations, equipment availability, amount of data to be collected from deer, and processing requirements. The greatest costs would generally be incurred when the deer and bait stations were difficult to access, when deer were wary of humans, the removal area was large, and when deer densities were lower (requiring more time to find each deer). Conversely, lower costs could be expected when the removal area was smaller, deer density was high (less time to find each deer), and deer were not wary of human activities. For this alternative, it is assumed that a qualified federal employee or contractor would conduct the lethal removal activities and collect biological data. NPS staff would collect samples for CWD testing and arrange for transport, processing, and appropriate disposal of deer carcasses (if needed).

Costs and efficiencies of sharpshooting programs have been assessed in the literature. One study documented that costs ranged from \$72 to \$260 per deer harvested (Warren 1997). A study in Minnesota compared methods to reduce deer abundance, and sharpshooting averaged \$121 per deer harvested (Doerr, McAnich, and Wiggers 2001). Gettysburg National Military Park reported that costs averaged \$128 per deer, with 355 deer removed (Frost et al. 1997). In a suburban area near Minneapolis, the cost for a contractor to remove 36 deer in 2004 was \$400 per deer based on several bait station locations, difficult access to removal locations, and a lower deer density (NPS 2008a). A recent estimate from APHIS to conduct sharpshooting activities within the park indicated a range of costs between \$195 and \$209 per deer in years 1 and 2, depending on level of processing (gutting or ungutted).

It is estimated that this alternative would cost \$200 per deer for the first four years and would increase to \$400 per deer as the population decreased and deer became more wary of human activities. However, with a smaller population, even though the cost per deer might increase because of the additional time needed to locate deer, the overall removal costs could decrease, because fewer deer would have to be removed.

Capture and Euthanasia

Factors affecting the final cost of implementing this element of Alternative C include the number of deer removed via this method, location of the removal, accessibility, type of trap or immobilization drug used, and the type of euthanasia used. Based on the experience of NPS personnel and the range of costs identified for capturing deer under the reproductive control action, costs could range from \$100 to \$1,000 per deer. Actual costs for this method would likely be closer to the middle of the range (\$500).

CWD Response Plan

Costs in addition to those under Alternative A would be incurred only if a confirmed case of CWD was documented within 5 miles of the park boundary or the park fell within a state-established CWD containment zone (Implementation Zone 1). Costs would vary based on when the CWD response threshold is reached, how many deer have been removed, and the success of the state's actions to reduce deer density in areas surrounding the park for the purpose of disease management. For example, if a confirmed case of CWD were documented within 5 miles of the park boundary and the park had already achieved the target deer density of 31-35 deer per square mile, and deer density in the surrounding environment were at least 31-35 deer per square mile, then no additional costs for CWD response would be incurred.

Costs for implementation of a rapid reduction to the deer density goal assume that deer density in the park is still high and that CWD is confirmed near the park early in the life of the plan. This expenditure would be unnecessary once the deer density goal has been achieved. Costs for implementation of a one-time reduction action to no less than 10 deer per square mile were based on the assumption that the initial deer density goal (31-35 deer per square mile) had been achieved. This estimate represents the number of additional deer that need to be removed over two years to achieve 10 deer per square mile. Implementation and number of deer removed is based on the success of the state in reducing deer density in surrounding communities for the purposes of disease management and therefore, costs associated with this action would vary.

CWD testing would be conducted by the NPS-BRMD at no cost for at least the first five years and it is assumed that this service would continue to be provided through the life of the plan. If NPS-BRMD is no longer able to provide testing services free of charge, an additional \$5 per test would be incurred. An additional hour of labor per deer would be required to obtain CWD samples from deer carcasses resulting from management actions, and to process and mail tissue samples. Labor costs are based on 50 deer per year and assume CWD would not be confirmed near the park for at least four years. Most materials required to conduct tissue biopsies were purchased for the park by NPS-BRMD in 2008. Additional materials would be required throughout the life of the plan and would be purchased approximately every three years throughout the life of this plan (e.g. disinfectant, plastic tarps).

If carcasses need to be stored until CWD test results are returned a refrigerated storage trailer would be leased. Costs associated with leasing of a 32-48 foot refrigerated storage trailer assumes that it would be needed for 6 months annually for a period of five years (minimally). Cost of leasing a refrigerated storage trailer is estimated to be \$8,400 (\$1,400 per month) annually including vehicle lease (\$950/month) and diesel fuel (\$450/month).

Disposal costs for CWD-positive deer represent cost per pound for incineration (\$1 to \$2.50 per pound). These costs only appear under Implementation Zone 1 where it is assumed that CWD is in the park. Costs were based on incineration due to the uncertainties surrounding the use of landfills for disposal of CWD-positive deer. Estimates assume an average weight of 100 pounds per deer.

Table D-3 Cost Estimate for Alternative C: Combined Lethal Actions

Action	Assumptions	Estimated Recurring Annual Cost	Estimated Cost for the 15-year Planning Period
Same actions as described for Alternative A (excluding CWD response)	See Alternative A	\$13,808 - \$22,262	\$232,482
Lethal Reduction Actions		\$30,750 - \$140,000	\$792,250
Sharpshooting	Years 1-2: 500 deer removed annually (\$200/deer) Years 3-4: 300 deer removed annually (\$200/deer) Years 5+: 20-50 deer removed annually (\$400 /deer) ^a	Years 1-2: \$100,000 Years 3-4: \$60,000 Years 5+: \$20,000	\$540,000 ^b
Carcass Processing	\$65 per deer for meat processing (meat donation)	Years 1-2: \$32,500 Years 3-4: \$19,500 Year 5+: \$3,250	\$139,750
Capture and euthanasia	15 deer maximum/year (estimated \$500/deer)	\$7,500	\$112,500
CWD Response^c		\$11,555 - \$14,555	\$436,600 - \$504,100
Active Lethal CWD Surveillance	Rapid Reduction to Target Deer Density	\$0	\$45,000
	One-Time Reduction	\$0	\$28,000
	Carcass Storage	\$0	\$42,000
	Carcass Disposal (CWD-positive)	\$1,000 - \$2,500	\$15,000 - \$37,500
CWD Testing	Additional labor to obtain CWD samples	\$1,750	\$26,250
Total Costs		\$56,113 - \$176,817	\$1,461,332 - \$1,528,832

Note: Cost over the life of the plan includes one-time and periodic costs (e.g., start-up costs, costs incurred every five years) in addition to the sum of annual recurring costs over 15 years.

- a Cost increase after year four is due to additional time needed to locate deer at a lower deer density.
- b This cost would increase if the deer density goal was not reached by the fourth year.
- c Refer to Appendix C: CWD Response Plan for a full explanation of costs associated with CWD surveillance.

Alternative D: Combined Lethal and Nonlethal Actions

Costs of implementing Alternative D would include the costs described under Alternative A (vegetation and deer population monitoring, small fenced areas, roadkill removal, public education, coordination with PGC, and initiating CWD monitoring), plus the costs of implementing lethal reduction to achieve the target deer density and reproductive control to maintain the population, as described under Alternatives B and C. If CWD were confirmed within 5 miles of the park boundary, or the park fell within a state-established CWD containment zone, costs associated with implementing active lethal CWD surveillance would be the same as described under Alternative C. The overall cost of implementing Alternative D would depend on the number of deer removed and/or treated, methods used, personnel/contractor costs, and the distance of a confirmed case of CWD from the park boundary (Implementation Zone 3, 2, or 1). Recurring annual costs associated with Alternative D are estimated between \$112,363 and \$176,817 in years 1-4 (lethal actions) and between \$108,363 and \$194,517 during years 5-15 (reproductive control). Costs over the life of the plan (15 years) are estimated between \$2,036,082 and \$2,925,282.

Cost over the life of the plan includes one-time and periodic costs (e.g., start-up costs, costs incurred every three years) in addition to the sum of annual recurring costs over 15 years.

Estimated costs for Alternative D are discussed below and summarized in Table D-4.

Sharpshooting

Factors affecting the final cost of implementing this alternative include deer density, number of deer to be removed, ease of access to deer, number and location of bait stations, equipment availability, amount of data to be collected from deer, and processing and disposal requirements. The greatest costs would generally be incurred when the deer and bait stations were difficult to access, when deer were wary of humans, the removal area was large, and when deer densities were lower (requiring more time to find each deer). Conversely, lower costs could be expected when the removal area was smaller, deer density was high (less time to find each deer), and deer were not wary of human activities. For this alternative, it is assumed that a qualified federal employee or contractor would conduct the lethal removal activities, process the deer, and collect biological data. NPS staff would arrange for processing and disposal of deer carcasses (if needed) and the transfer of meat to a local food bank (as appropriate).

Costs and efficiencies of sharpshooting programs have been assessed in the literature. One study documented that costs ranged from \$72 to \$260 per deer harvested (Warren 1997). A study in Minnesota compared methods to reduce deer abundance, and sharpshooting averaged \$121 per deer harvested (Doerr, McAnnich, and Wiggers 2001). Gettysburg National Military Park reported that costs averaged \$128 per deer, with 355 deer removed (Frost et al. 1997). In a suburban area near Minneapolis, the cost for a contractor to remove 36 deer in 2004 was \$400 per deer based on several bait station locations, difficult access to removal locations, and a lower deer density (NPS 2008a).

It is estimated that this alternative would cost \$200 per deer for the first four years and would increase to \$400 per deer as the population decreased. However, with a smaller population, even though the cost per deer might increase because of more time needed to locate deer, the overall removal costs could decrease, because fewer deer would have to be removed.

Capture and Euthanasia

The costs for capturing deer would likely vary. Factors would include the location of the removal, accessibility, type of trap or immobilization drug used, the means of deer disposal, and the type of euthanasia used. Based on the experience of NPS personnel and the range of costs identified for capturing deer under the reproductive control action, costs could range from \$100 to \$1,000 per deer. An experienced contractor estimates that the minimum cost for capture and euthanasia would be \$400 per animal (White Buffalo, Inc. 2005); therefore, actual costs for this method would likely be closer to the middle of the range (\$500).

Reproductive Control

The costs of implementing reproductive controls on a population that has undergone reduction efforts for several years would vary depending on advances in reproductive control technology, sensitivity of the deer population to humans, methods used by the qualified federal employees or contractors, changes in immigration with reduced deer density, and general deer movement behavior (Porter et al. 2004; Naugle et al. 2002). A recent estimate from the USDA-APHIS (APHIS, pers. comm. 2008) to implement reproductive control after reduction of the deer population to 31-35 deer per square mile indicates a cost of \$1,900 per deer. Compared to Alternative B, there would be fewer deer to treat, and those deer are more wary of humans. Therefore, it would be more difficult (i.e., take longer) to find and treat the necessary number of deer.

CWD Response Plan

Assumptions made in estimating the cost for the CWD Response Plan are the same as those described under Alternative A and C.

Table D-4 Cost Estimate for Alternative D: Combined Lethal and Nonlethal Actions

Action	Assumptions	Estimated Recurring Annual Cost	Cost for the 15-Year Planning Period
Same actions as Alternative A (excluding CWD response)	See Alternative A	\$13,808 - \$22,262	\$232,482
Lethal Reduction		\$87,000 - \$140,000	\$454,000
Sharpshooting	Years 1-2: 500 deer removed annually (\$200/deer) Years 3-4: 300 deer removed annually (\$200)	Years 1-2: \$100,000 Years 3-4: \$60,000	\$320,000 ^a
Capture and Euthanasia	Years 1-4: 15 deer maximum/year (estimated \$500/year)	\$7,500	\$30,000 ^a
Carcass Processing	\$65 per deer for meat processing (meat donation)	Years 1-2: \$32,500 Years 3-4: \$19,500	\$104,000
Reproductive Control^b	Assume starting in Year 5. \$1,000-\$1900/deer x 83 does (Assumes target deer density of 35 deer per square mile)	\$83,000 - \$157,700	\$913,000 - \$1,734,700^a
CWD Response^c		\$11,555 - \$14,555	\$436,600 - \$504,100
Active Lethal CWD Surveillance	Rapid Reduction to Target Deer Density	\$0	\$45,000
	One-Time Reduction	\$0	\$28,000
	Carcass Storage	\$0	\$42,000
	Carcass Disposal (CWD-positive)	\$1,000 - \$2,500	\$15,000 - \$37,500
CWD Testing	Additional labor to obtain CWD samples	\$1,750	\$26,250
Total Costs		Lethal Actions: \$112,363 - \$176,817 Reproductive Control: \$108,363 - \$194,517	\$2,036,082 - \$2,925,282 (Combined lethal and nonlethal actions)

Note: Cost over the life of the plan includes one-time and periodic costs (e.g., start-up costs, costs incurred every five years) in addition to the sum of annual recurring costs over 15 years.

a This cost would increase if the deer density goal was not reached by the fourth year.

b Cost over the life of the plan for reproductive control is based on a decrease in population size of 33% by year 5 and a decrease of 67% by year 10.

c Refer to Appendix C: CWD Response Plan for a full explanation of costs associated with CWD surveillance.

Appendix E: Review of White-tailed Deer Reproductive Control

Introduction

Managing the overabundance of certain wildlife species has become a topic of public concern (Rutberg et al. 2004). Species such as Canada geese (*Branta canadensis*), coyotes (*Canis latrans*), and white-tailed deer (*Odocoileus virginianus*) have become either locally or regionally overabundant throughout the United States (Fagerstone et al. 2002). In addition, traditional wildlife management techniques such as hunting and trapping are infeasible in many parks and suburban areas, forcing wildlife managers to seek alternative management methods.

The use of reproductive control in wildlife management has been assessed for several decades. Its use has gained more attention, as the public has become more involved in wildlife management decisions. Interest in reproductive control, as an innovative alternative to traditional management methods, has led to the current state of the science (Baker et al. 2004). Often, the use of reproductive control is promoted in urban and suburban areas where traditional management tools, such as hunting, are publicly unacceptable or illegal due to firearm restrictions (Kilpatrick and Walter 1997; Muller, Warnen, and Evans 1997).

In order for reproductive control agents to effectively reduce population size, treatment with an agent must decrease the reproductive rate to less than the mortality rate. In urban deer populations, mortality rates are generally very low (approximately 10%). Therefore, it would be necessary to treat 70-90% of the female deer, with a highly efficacious product, to effectively reduce or halt population growth (Rudolph, Porter, and Underwood 2000).

The purpose of this document is to provide NPS managers at Valley Forge National Historical Park with: (1) a brief overview of reproductive control options as they pertain to white-tailed deer; (2) an outline of the primary advantages, disadvantages and challenges related to the application of wildlife fertility control agents including population management challenges, regulatory issues, potential logistical issues, and consumption issues; (3) evaluate current fertility control agents against criteria established by the park for an acceptable agent; and (4) provide a relatively comprehensive list of literature to refer to for additional information. This document is not intended to be exhaustive but to provide a scientifically sound basis for understanding and evaluating deer management alternatives that include reproductive control of does.

It is important to note that some of the most critical elements of a successful population level fertility control program focus on ecological and logistical questions rather than on the biological action of fertility control agents in individual animals. These issues can lead to less than optimal results when analyzing fertility control as a method of population regulation in free-ranging wildlife populations. It should also be noted that technology is changing rapidly in this field of research and updated information should be reviewed prior to implementation of a deer management program that involves fertility control.

Current Technology

The area of wildlife contraception is constantly evolving as new technologies are developed and tested. For the sake of brevity, this appendix will only discuss reproductive control as it applies to female deer. There is a general understanding in white-tailed deer biology that managing the female component of the population is more important than managing the male component. Based on the polygamous breeding behavior of white-tailed deer, treating males with reproductive control would be ineffective if the overall goal is population management (Warren 2000).

There are three basic categories of reproductive control technology: (1) immunocontraceptives (vaccines), (2) non-immunological methods (pharmaceuticals), and (3) physical or chemical sterilization.

Immunocontraceptives

It is suggested that immunocontraceptive vaccines offer significant promise for future wildlife management (Rutberg et al. 2004). Immunocontraceptive treatment involves injecting an animal with a vaccine that “stimulates its immune system to produce antibodies against a protein (antigen) involved in reproduction” (Warren 2000). In order to provide for sufficient antibody production, an adjuvant is combined with the vaccine. An adjuvant is a product that increases the intensity and duration of the immune system’s reaction to the vaccine. There are two primary types of antigens used in reproductive control vaccines in deer: porcine zona pellucida (PZP) and gonadotropin releasing hormone (GnRH).

Neither PZP nor GnRH vaccines are 100% effective in preventing pregnancy. Curtis et al. (2002) demonstrated approximately 85-90% efficacy for both GnRH and PZP immunocontraceptive vaccines in white-tailed deer. Over a 13-year period on Assateague Island National Seashore, contraceptive efficacy in PZP-treated horses ranged from 92 to 100% (Kirkpatrick and Turner 2008). However, efficacy generally decreases as antibody production wanes. Decreases in pregnancy rates can usually be expected for 1-2 years post-treatment with immunocontraceptive vaccines. How long infertility lasts is strongly related to the conjugate antigen design, the adjuvant used, and how the vaccine is delivered (Miller et al. 2008).

Porcine Zona Pellucida (PZP)

The majority of immunocontraceptive research in wildlife has been conducted using PZP vaccines. PZP vaccines stimulate production of antibodies directed towards specific outer surface proteins of domestic pig eggs. Pig eggs are sufficiently similar to many other mammals’ eggs that antibodies produced will cross-react with the vaccinated animal’s own egg. PZP antibodies prevent fertilization, presumably by blocking the sperm attachment site on the zona. This type of vaccine stimulates an immune response to the egg coat proteins and is therefore only effective in female deer. There are currently two PZP vaccine products being developed, one is simply called PZP and the other SpayVac®. SpayVac® (ImmunoVaccine Technologies, Halifax), uses a liposome preparation of PZP (with adjuvant) and has been evaluated in a variety of species, including white-tailed deer (Brown et al. 1997; Fraker et al. 2002; Locke et al. 2007; Rutberg and Naugle 2009). The other PZP vaccine, often referred to as “native” PZP, does not use liposome technology but also has been used extensively in white-tailed deer and other species in the course of investigating its effectiveness (Rutberg and Naugle 2008; Kirkpatrick et al. 1997; Turner, Kirkpatrick, and Liu 1992, 1996; Walter et al. 2002a, 2002b).

PZP vaccines have been tested in more than 70 captive wildlife species with variable success in preventing reproduction for variable durations of time (Kirkpatrick, Sphor, and DeNicola 1997; Kirkpatrick et al 1996b). The native PZP vaccine has also been tested extensively in free-ranging white-tailed deer (Rutberg and Naugle 2008; Naugle et al. 2002; Rudolph et al. 2000; Rutberg et al. 2004; Walter et al. 2002a, 2002b; Walter, Kilpatrick, and Gregonis 2003). Native PZP was first used successfully to control reproduction in white-tailed deer in 1992 (Turner, Liu, and Kirkpatrick 1992). Potential benefits of this vaccine include the ability to deliver the vaccine remotely, safety in pregnant deer and non-target species (e.g., dogs, horses) (Barber and Fayrer-Hosken 2000), and the availability of at least some long-term data on population level effects. The currently available PZP vaccine formulation is effective for two years (Turner et al. 2007), though longer multiyear applications are also being studied.

SpayVac® provides the same advantages as native PZP but may result in infertility for up to seven years (Miller et al. 2009). Potential advantages of SpayVac® compared to the native PZP vaccine are: “1) a more rapid immune response, 2) higher antibody titers, 3) a higher proportion of antibodies that bind to target sites, and 4) longer duration of efficacy” (Fraker and Bechert 2007). Although little long-term data on population level effects exists for SpayVac®, it is assumed they are similar to those for the native PZP formulation.

There are few field studies that have evaluated population-level effects of fertility control (Rutberg et al. 2004; Hobbs, Bowden, Baker 2000; Rudolph et al. 2000). Research evaluating the effectiveness of PZP in reducing the size of deer populations has focused on moderate to high density deer populations of relatively small size (< 300-500 individuals). Within these populations, long-term (> 10 years) data indicates that population size of long-lived species (e.g. deer, horses) may be gradually decreased using PZP treatments (Kirkpatrick and Turner 2008, Rutberg and Naugle 2008). Rutberg and Naugle (2008) reported a 27% decline in the size of a small, suburban deer population (approximately 250 deer) between 1997 and 2002, as a result of PZP treatments and potentially other stochastic events. However, level of success in reducing population size, reported for white-tailed deer, varies widely. For example, deer density on Fire Island National Seashore was significantly reduced in some areas but reduced very little in other areas (Rutberg and Naugle 2008, Underwood 2005). Success in controlling deer populations is dependent on a variety of factors including population size (ability to treat a sufficient number of does), “vaccine effectiveness, accessibility of deer for treatment, and site-specific birth, death, immigration, and emigration rates” (Rutberg and Naugle 2008).

Additionally, PZP-treated wildlife may experience increased body condition and a longer life span compared to untreated individuals as a result of reduced energetic costs of pregnancy and lactation (Warren 2000, Hone 1992). For example, at Assateague Island National Seashore, the life span of horses treated with PZP has been extended from an average age at death of 20 years to 26-30 years (Kirkpatrick and Turner 2008, Zimmerman 2009 pers. *comm.*). Longer life span may extend the time needed to observe a decline in population size (Kirkpatrick and Turner 2008; Rutberg and Naugle 2008). Additional research is needed to determine how fast a population can be reduced, how deep a reduction can be achieved, and what landscapes are best suited to use of fertility control as a management tool (Rutberg and Naugle 2008).

Challenges to the use of PZP include behavioral impacts, frequency of treatment (need for booster shots), use of meat for human consumption, and the need to

permanently mark treated animals. PZP based vaccines often cause abnormal out of season breeding behavior in treated deer populations (Fraker et al. 2002; McShea and Rappole 1997), as treatment with PZP leads to repeated estrous cycling in females and associated behavioral changes. This may result in late pregnancies, higher fawn mortality, and possibly an extended breeding season or rut (Fraker et al. 2002; McShea and Rappole 1997). Additionally, any effect that could extend the rut also has the potential for secondary effects to the individual deer. Increased attempts to breed may result in increased deer movements. This may be problematic in areas with high vehicle use, as there could be increases in deer-vehicle collisions. However, the only known research evaluating this specific issue reported that deer treated with PZP were at no greater risk of being involved in a deer-vehicle collision than untreated deer (Rutberg and Naugle 2008). It should be noted that some late breeding can occur naturally in high density deer populations and anecdotal evidence suggests that this phenomenon already occurs occasionally at Valley Forge NHP (e.g. fawns with spots observed in October/November)(Heister 2008 *pers. comm.*). It should also be noted that in a small number of cases, permanent infertility in horses has been reported in association with SpayVac® (Fraker 2009). Additional research is needed to evaluate the potential for sterility in white-tailed deer.

Successful field application of a fertility control program requires both an effective agent and a practical delivery system (Cowan et al. 2002). Although PZP vaccines may be successfully delivered remotely through darting, the PZP vaccine also currently require periodic boosters in order to maintain infertility, usually two injections, at least three weeks apart, during the first year. The need for booster shots leads to significant logistical issues when working with free-ranging white-tailed deer, particularly when the number of deer to be treated is high. New research involving controlled-release native PZP formulations incorporates primer and booster immunizations into one injection and may extend the period of infertility (Turner et al. 2008). Turner et al. (2008) provides an overview of the current status of research related to controlled-release components of native PZP contraceptive vaccines. SpayVac® currently does not require an immediate booster and may prove to be easier to implement since booster shots would only be required every 3-7 years (Fraker 2009). It is expected that development of a long-acting, single shot treatment will improve the ability of NPS units to implement this vaccine as a deer management tool.

If a product is intended for use in a food-producing animal, it must be tested for safety to human consumers, and the edible animal products must be free of unsafe drug residues (<<http://www.fda.gov/cvm/aboutona.htm>>). The Food and Drug Administration (FDA), Office of New Animal Drug Evaluation is the current regulatory agency responsible for this determination for PZP vaccines. FDA has not yet determined whether PZP vaccine components pose a human health risk. Although FDA approval is the standard for drugs being considered for human consumption, PZP may still be used under an Investigational New Animal Drug (INAD) exemption as a research tool. It is expected that regulatory authority for PZP vaccines will shift to the Environmental Protection Agency (EPA) in the near future. Once it becomes transferred to EPA regulation and until it becomes an EPA-registered contraceptive for wild deer it would have to be used in a research context under an EPA “experimental use” permit.

Until approved by the FDA or registered by the EPA, treated animals should be permanently marked so as not to enter the human food chain. Marking is also required for long-term monitoring of contraceptive efficacy, determining which deer have been treated during implementation, and evaluating management success

through an adaptive management approach. At Fire Island National Seashore, treated deer are only marked temporarily using dye packs and therefore researchers have been unable to assess reproduction in treated deer or contraceptive efficacy since 1995 (Rutberg and Naugle 2008). Additionally, NPS units are mandated to cooperate and coordinate with state agencies to manage cross boundary wildlife resources whenever possible (43 CFR part 24). Therefore, parks should also consult with appropriate state agencies regarding marking of treated animals in areas where deer may cross park boundaries. For example, the Pennsylvania Game Commission requires that deer treated with fertility control agents be permanently marked regardless of FDA approval/EPA registration (PGC 2009). The disadvantages of permanent marking are primarily related to the substantial additional labor and costs of the first year's capture and marking of treated animals (up to \$1,500/deer), sustainability over the long-term, and associated stress to individual deer (compared to remote delivery).

Finally, there is general agreement that because of the logistical difficulties of treating significant numbers of deer that controlling large, free-ranging populations of wild ungulates solely with a contraception vaccine is impractical and unlikely to succeed (Rutberg et al. 2004; McCullough 1996; Garrott 1991, 1995; Curtis et al. 1998; Warren et al. 1992, 2000; Rudolph, Porter, and Underwood 2000; Cowan et al. 2002; Merrill, Cooch, and Curtis 2003). There is also agreement that fertility control as a sole means of managing populations cannot reduce wildlife population size rapidly (Rutberg and Naugle 2008; Kirkpatrick and Turner 2008). The few long-term (> 10 years) research projects evaluating population level effects of PZP on long-lived species (horses and deer) support this statement. At Assateague Island National Seashore, PZP treatments were successful in reducing the wild horse population 16% (from 160 to 135 individuals) between 1994 and 2009 (15 years). The park expects to reach the target population size of 135 horses in another 8-9 years (Zimmerman 2009 *pers. comm.*). At Fire Island National Seashore, park managers report a 33% reduction in overall deer population size (from approximately 600 to 400 individuals) between 1994 and 2009 (Bilecki 2009 *pers. comm.*). In the most intensively treated areas of the park deer population size decreased up to 55% over 15 years (Rutberg and Naugle 2008). Therefore, the appropriateness of fertility control as a deer management tool also is heavily dependent on specific park objectives and the purpose and need for management.

Additional information on PZP may be obtained at: http://www.aphis.usda.gov/wildlife_damage/nwrc/research/reproductive_control/index.shtml or <http://www.pzpinfo.org>.

Gonadotropin Releasing Hormone (GnRH) Vaccines

GnRH is a small neuropeptide (a protein-like molecule made in the brain) that plays a necessary role in reproduction. It is naturally secreted by the hypothalamus (a region of the brain that regulates hormone production), which directs the pituitary gland to release hormones (luteinizing hormone and follicle stimulating hormone) that control the proper functioning of reproductive organs (Hazum and Conn 1998). In an attempt to interrupt this process, research has focused on eliminating the ability of GnRH to trigger the release of reproductive hormones. One solution that has been investigated is a vaccine that, when combined with an adjuvant, stimulates the production of antibodies to GnRH. These antibodies likely attach to GnRH in the hypothalamic region and prevent the hormone from binding to receptors in the pituitary gland, thus suppressing the secretion of reproductive hormones and preventing the release of eggs/sperm.

The use of GnRH vaccines has been investigated in a variety of both wild and domestic ungulates (hoofed mammals) (Curtis et al. 2002; Miller Johns and Killian 2000c; Miller, Rhyon, and Drew 2004). In recent years, a great deal of research has been done on their effectiveness. One such GnRH vaccine being researched and developed is GonaCon™. Regulatory authority for GnRH vaccines was moved from the FDA to the EPA in 2006. Although not yet commercially available, GonaCon™ is expected to be submitted for EPA approval in 2009, as a contraceptive “pesticide” for managing white-tailed deer populations (Fagerstone et al. 2008; USDA 2008). Approval could occur within 12-18 months and it is expected to be registered as a “Restricted Use” product (USDA 2008). Labeling is likely to require hand injection, since an effective remote delivery system has yet to be developed, as well as permanent marking of treated individuals.

As with PZP, GonaCon™ has been shown to successfully control reproduction in wildlife species including white-tailed deer (Miller Johns and Killian 2000b). Potential benefits of this vaccine include a longer-lasting contraceptive effect and possibly the lack of repeated estrous cycles. In white-tailed deer, GnRH is estimated to be approximately 85-100% effective in preventing pregnancy during the first year post-treatment (Miller et. al. 2008, USDA 2008), however long-term field efficacy data currently does not exist (USDA 2008). The contraceptive effect typically last two years but may last for up to four years in some individuals (Fagerstone et al. 2008; USDA 2008). GnRH applications are currently being researched to determine the potential for use as a wildlife management tool (USDA 2008).

Repeated estrous cycling and other behavioral changes in white-tailed deer have not been documented in association with GnRH vaccines due to their mode of action (Curtis et. al. 2008). Preventing the release of eggs results in no estrous cycle and may reduce breeding behaviors in female deer (Killian et al. 2008). However, Killian et al. (2008) reported that behavioral expressions of estrus were only decreased for 1-2 years post-treatment and increased in subsequent years despite does remaining infertile.

GnRH vaccines have many of the same challenges associated with PZP including frequency of treatment (booster shots), human consumption issues, and the need to permanently mark treated animals. Additionally, as with PZP, immune response to the adjuvant also may cause difficulties with a population of treated deer when determining the Johne’s disease status (a gastrointestinal disease of potential regulatory importance for domestic livestock).

Although longer-acting (1-4 years), infertility in deer treated with GnRH vaccines is reversible as antibody levels wane. Studies of penned and free-ranging deer indicated GonaCon™ was 88-100% effective in year 1 and 47-70% effective in the second year post-treatment (Fagerstone et al. 2008). As with PZP, multiple injections or booster shots are needed to increase the contraceptive efficacy and longevity of the vaccine (Fagerstone et al. 2008). However, with GnRH vaccines booster shots may be required less frequently. Research is expected to continue to improve the single-shot, multiyear vaccine (Miller et. al. 2008).

It is currently unknown how issues related to human consumption will be addressed by the EPA. EPA approval requires Toxicology or Human Health Hazard studies to evaluate potential threats to humans based on the duration and route of exposure to pesticides (Fagerstone et al. 2008). It should be noted that the adjuvant used in GonaCon™, an adaptation of the commercially available vaccine Mycopar™, is approved for use in food animals and that the FDA had indicated that “in general,

the components of this product do not raise a human food safety concern” (Fagerstone et al. 2008). However, until GonaCon is EPA-registered and product labeling known, treated animals should be permanently tagged to avoid entry into the human food chain and promote identification of treated versus untreated individuals. Once EPA-registered as a contraceptive ‘pesticide’, it is possible that product labeling will require permanent marking of treated animals. As indicated above, the disadvantages of permanent marking are primarily related to the substantial additional labor and costs of the first year’s capture and marking of treated animals, sustainability over the long term, and associated stress to individual deer (compared to remote delivery).

Other challenges to use of GnRH vaccines including health effects on target (deer) and non-target species, lack of information related to effectiveness at the population level in free-ranging deer, and lack of an adequate remote delivery application. Killian et al. (2006a) concluded that GonaConTM was safe for deer and that there were no adverse health impacts associated with unintentional repeated vaccination. However, a variety of health problems have been associated with certain types of GnRH adjuvants (e.g. Freund’s Complete Adjuvant) ranging from granulomas to loss of primary and secondary sexual characteristics (males) and occasionally death (Curtis et al. 2008; Killian et al. 2006a). A granuloma is a localized inflammatory response to components of the GnRH adjuvant that may occur at the site of injection for up to three years post-treatment (Curtis et al. 2008). This is the most commonly reported physiological side effect of GnRH vaccines, including GonaConTM (USDA 2008). There is little information regarding vaccination of pregnant animals and although GnRH vaccines are not believed to be harmful to non-target species, there is little information regarding the theoretical human and non-target species health risks.

Overall, no significant, long-term impacts to health or changes in behavior have been consistently documented in female deer in association with GnRH vaccines (USDA 2008; Killian et al. 2006a). However, GnRH vaccines are not recommended for use in male deer due to an increased mortality rate (compared to treated female deer) and impacts associated with loss of primary and secondary sexual characteristics such as smaller gonads, failure of antlers to harden and shed velvet, malformed (atypical) antlers, and associated changes in breeding behaviors (Curtis et al. 2008; Miller, Johns, and Killian 2000c).

As stated above, GnRH applications are currently being researched to determine the potential for use as a wildlife management tool (USDA 2008). Long-term field efficacy data currently does not exist (USDA 2008) and thus questions still remain regarding whether populations can be reduced, how deep a reduction could be achieved, how fast reduced would occur, and what landscapes would be best suited to use of fertility control as a management tool (Rutberg and Naugle 2008).

Lastly, successful field application of a fertility control program requires both an effective agent and a practical delivery system (Cowan et al. 2002). The ability to deliver contraceptive vaccines using a remote delivery application is an important logistical issue. A well-developed system of remote delivery eliminates the need to capture and handle deer after initial immunizations and may substantially reduce implementation costs. Additionally, as described under PZP, there is general agreement that controlling large, free-ranging populations of wild ungulates solely with a contraception vaccine (PZP or GnRH) is impractical, unlikely to succeed (McCullough 1996, Garrott 1991 and 1995, Curtis et al. 1998; Warren et al. 1992, and 2000; Rudolph, Porter, and Underwood 2000; Cowan et al. 2002; Merrill,

Cooch, and Curtis 2003), and cannot reduce wildlife population size rapidly. Therefore, the appropriateness of fertility control as a deer management tool also is heavily dependent on specific park objectives and the purpose and need for management.

Additional information may be obtained at: <http://www.aphis.usda.gov/wildlife_damage/nwrc/research/reproductive_control/index.shtml>.

Non-immunological Reproductive Control Methods

This group of reproductive control agents includes GnRH agonists, GnRH toxins, steroid hormones, and contragestives.

GnRH Agonists

GnRH agonists are highly active analogs of GnRH which are similar in structure and action to the endogenous hormone. These agonists attach to receptors in the pituitary gland. By attaching to the receptors, these agonists reduce the number of binding sites available and thereby temporarily suppress the effect of the GnRH. As a result of this suppression, reproductive hormones are not released (Aspden et al. 1996; D'Occhio, Aspden, and Whyte 1996). Continuous administration of the agonist is necessary to maintain infertility. This can be accomplished with controlled-release formulations or surgically implanted pumps in addition to daily administration.

Not all agonists have the same effects in all species. In fact, some can have an effect that is the opposite of what is intended. The wide variation in response is likely due to a combination of type of agonist, dose, treatment regime, reproductive status, sex, and species (Becker and Katz 1997). Therefore, it is important to fully understand the effects of a product on a given species. Although many GnRH agonists are used in human as well as veterinary medicine only a few have been investigated in wildlife species (Becker and Katz 1997, Vickery 1986). GnRH agonists have been tested primarily in mule deer and elk and been shown to both suppress reproductive hormones and prevent pregnancy (Baker et al. 2004, 2005). Additionally, GnRH agonists have not been documented as causing behavioral changes when applied to female deer (Baker et al. 2004). Researchers believe this may be a useful tool in the future for preventing pregnancy in white-tailed deer as well.

Leuprolide Acetate

Leuprolide is one GnRH agonist that has been studied. Tests reveal that when it is administered as a controlled-release formulation, it results in 100% pregnancy prevention in treated female elk and mule deer (Baker et al. 2002, 2004; Conner et al. 2007). In addition, the treatment is reversible, and the effects last only for a specific period of time (90-120 days) (Baker et al. 2004; Trigg et al. 2001). Advantages of leuprolide acetate are that it is 100% effective in preventing pregnancy, is safe for human consumption (Baker et al. 2004), can be delivered remotely (Baker et al. 2005), does not result in physiological side effects, and short-term behavioral effects are minimal (Conner et al. 2007).

Leuprolide has been FDA-approved for use in humans and can be used with a veterinary prescription under the Animal Drug Use and Clarification Act of 1994. The prescribing veterinarian and the client (NPS unit) must clearly understand how and why the drug would be used in an off-label manner. It is the responsibility of the prescribing veterinarian to give an appropriate meat withdrawal period (the time it takes for the animal to metabolize and clear the drug from its tissue) for food-producing animals that may enter the human food chain.

The need to deliver leuprolide through a subcutaneous hand injection has traditionally been considered a significant barrier to the long-term application of this drug as a wildlife management tool. However, Baker et al. (2005) recently developed a successful dart delivery system that may extend the practical application of this contraceptive. This research also demonstrated the effectiveness of leuprolide when delivered via an intramuscular injection.

Treatment using leuprolide differs from GnRH vaccines in that it does not require an adjuvant and does not induce an antibody reaction. Therefore, inflammatory responses to adjuvant components and other physiological effects, often observed with immunocontraceptives, have not been observed in association with leuprolide. It does, however, require a slow release implant that remains under the skin or in the muscle for the duration of the treatment effectiveness. Additionally, leuprolide is not likely pose a threat to the environment or nontarget species (Baker et al. 2004); however, this hypothesis has not been extensively researched.

In addition to the paucity of information specific to use of leuprolide in white-tailed deer, there are significant challenges to the practical application of leuprolide to control or stabilize deer populations. As stated above, contraceptive efficacy lasts only 90-120 days (Baker et al. 2004; Trigg et al. 2001) and therefore females must be treated within a very short timeframe prior to the breeding season (Conner et al. 2007). If a female is not retreated then she has the same chances of becoming pregnant as an animal that was never treated. The need to treat a potentially large number of individuals within a very short period of time, on an annual basis, reduces the feasibility of leuprolide as a wildlife management tool, particularly for large, free-ranging deer populations.

Histrelin Acetate

Histrelin acetate has been found to be effective in suppressing a key reproductive hormone in white-tailed deer (Becker, Enright, and Katz 1995). However, testing was administered using a mini-pump that was surgically implanted under the animal's skin. This is an infeasible route of administration in free-ranging animals. In the future, a delivery system with slow release characteristics may help to make this a more feasible option for free-ranging wildlife. It is likely that histrelin acetate will also suppress ovulation and pregnancy in white-tailed deer, although this remains to be tested.

GnRH Toxins

GnRH toxins consist of a cellular toxin that is combined with a GnRH analog (or analogue). A GnRH analog is a synthetic peptide drug modeled after the human hypothalamic gonadotropin-releasing hormone which allows the toxin to attach to GnRH receptors. The toxin is then carried to the receptors in the pituitary gland and is internalized or absorbed. Once absorbed, the toxin disrupts the production of cellular proteins and can lead to cellular death. When this occurs, the production of reproductive hormones (leuteinizing hormone and follicle stimulating hormone) is affected. This process has been studied in male dogs (Sabeur et al. 2003), domestic sheep (Nett et al. 1999), rats (Kovacs et al. 1997), and female mule deer (Baker et al. 1999) but the technology is still in the developmental stages.

Steroid Hormones

The field of wildlife contraception began with research examining the manipulation of reproductive steroid hormones. Treatments using steroids can include administering high doses of naturally occurring hormones, such as estrogen or progesterone. However, the treatment usually entails the application of synthetic

hormones, such as norgestomet, levangesterol, and melangestrol acetate. Available products are administered via slow release implants or repeated feeding have demonstrated variable efficacy and duration of infertility. Most products that are available are used in domestic animal or zoological veterinary medicine and have not been used widely in free-ranging wildlife. Some issues related to using steroids include difficulties in treating large numbers of animals for extended periods of time, negative side effects experienced by the treated animals, and concerns over the consumption of treated animals by nontarget species, including humans. Animals treated with steroids must be permanently marked to prevent entry into the human food chain.

Contraceptives

Contraceptives are products that terminate pregnancy. Progesterone is the primary gestational hormone for maintaining pregnancy in mammals. Many contraceptives act by preventing progesterone production or blocking its effect, thereby affecting pregnancy. The primary contraceptive that has been researched for use in domestic animals and white-tailed deer is an analog of Prostaglandin $F_{2\alpha}$ (PGF $_{2\alpha}$) (Becker and Katz 1994; DeNicola, Kesler, and Swilhart 1997; Waddell et al. 2001). Lutalyse® is a commercially available form of PGF $_{2\alpha}$. Unlike many of the other alternatives, there are no issues related to consumption of the meat when it has been previously treated with this product. Challenges with contraceptives include timing of administration, efficacy, potential to rebreed if breeding season is not finished, and the potential for aborted fetuses on the landscape.

Sterilization

Sterilization can be either a surgical or chemical treatment process. Chemical sterilization, disrupting reproductive organs using tissue irritating agents, is typically performed on males as a contraceptive measure. Surgical sterilization is an invasive procedure generally performed on females. Successful implementation is generally 100% effective in preventing pregnancy and this method is common in managing domestic animal fertility. Implementation requires capture, general anesthesia, and surgery conducted by a qualified veterinarian which is generally considered labor intensive and costly and calls into question the long-term sustainability of sterilization as a wildlife management tool, except under limited circumstances.

Depending on the method of sterilization, this procedure may have behavior effects on both male and female deer. If gonads are removed, then the source of important reproductive hormones will be removed. This is likely to change deer social interactions. If gonads are not removed, females will continue to ovulate and show behavioral signs of estrus and consequently may extend the breeding season.

Additionally, the majority of research involving sterilization as a wildlife management tool has made assumptions that may limit its general applicability. These assumptions are: “(1) complete control in targeting and sterilizing segments of the population, (2) deterministic models reliably predict outcomes, (3) no behavioral changes occur due to sterilization, and (4) population closure” (Merrill, Cooch, and Curtis 2006). Rarely can these assumptions be met in free-ranging wildlife populations. In open populations, where there may be significant immigration and imprecise control over the capture process it is unlikely that sterilization would be an effective means of reducing populations (Merrill, Cooch, and Curtis 2006).

Conditions that may contribute to successful use of sterilization to reduce abundant deer populations include small population size and demographic closure (or nearly so) (Merrill, Cooch, and Curtis 2006). It should also be noted that reversibility is often considered a desirable trait for long-term wildlife management methods. Therefore, the appropriateness of sterilization as a deer management tool also is heavily dependent on specific park objectives and the purpose and need for management. Overall, sterilization is considered to be ineffective and too labor and cost intensive for wide-scale use in large, free-ranging wildlife populations.

Evaluation of Fertility Control Agents Based on Selection Criteria Established by Valley Forge NHP

Four criteria were established for Valley Forge NHP that reflect minimum desired characteristics for a reproductive control agent. Only when these criteria are met would reproductive control be implemented. These criteria assume that the agent poses no significant health risk to the deer.

- 1) It would have multiple-year efficacy (3-5 years at 85-100% efficacy) to minimize the cost and labor required to administer the drug to a large number of deer every year.
- 2) It would be able to be delivered remotely (darting) to avoid capturing the animal and to increase the efficiency of distribution.
- 3) It would not leave hormonal residue in the meat which would prevent the meat from being used for human consumption. Successful achievement of this criterion would be represented by either FDA or EPA regulatory approval, including product labeling.
- 4) It would have limited behavioral impacts on the deer population.

Table E-1 Evaluation of Fertility Control Agents based on Selection Criteria for Valley Forge NHP

Agent	Criteria 1	Criteria 2	Criteria 3	Criteria 4
Immun contraceptives				
Standard “Native” PZP	No ^a	Yes	No	Yes
SpayVac®	Possibly ^b			
GnRH	Possibly ^c	No	No	Yes
GnRH Agonists				
Leuprolide Acetate	No	Yes	Yes	Yes
Histrelin Acetate	No	No	Yes	Unknown
GnRH Toxins	Unknown	Unknown	Unknown	Unknown
Steroid Hormones	No	No	No	Unknown
Contragestives	No	Yes	Yes	Possibly ^d

^a Initial research on one-shot, multiyear PZP vaccine has demonstrated 88.3% efficacy in Year 1 and 75% efficacy in the second year post-treatment (Turner et al. 2008). Research is currently on-going to evaluate effectiveness in year 3 and beyond. Dr. Allen Rutberg has indicated that “based on the design of the vaccine and our experience with horses, it’s unlikely that the vaccine would have much effect past the third year” (Rutberg 2009). However, research on this vaccine is still developing and is expected to continue into the future.

^b SpayVac® has demonstrated 80%-100% efficacy for up to 5-7 years in horses and deer (Fraker 2009; Miller et al. 2009; Killian et al. 2006c). The term “possibly is used because long-term studies (>5 years) have been conducted only in captive deer and had a small sample size in each treatment group (N=5) (Miller et al. 2009).

^c Recently published research on one-shot, multiyear GnRH vaccine in penned/captive deer indicates GonaCon™ is 88-100% effective in Year 1 and 47-100% effective in year 2 and 25-80% effective up to 5 years post-treatment (Miller et al. 2008). The term “possibly” is used because the multi-year formulation has been used only in captive deer, had a small sample size, and lacks confidence intervals on the data.

^d Possibly is used here to reflect concern related to aborted fetuses on the landscape. Although primarily a human dimensions impact, abortion can have a negative impact on doe health if it occurs later in gestation. Additionally, if a fetus is aborted early when males are still in rut they may re-breed, extending the period of rut and failing to result in infertility.

Literature Cited and Selected Bibliography

- Adams, T. H., and B. M. Adams
1990 "Reproductive Function and Feedlot Performance of Beef Heifers Actively Immunized Against GnRH." *Journal of Animal Science* 68:2793-2802.
- Asa, C. S., L. J. D. Zaneveld, L. Munson, M. Callahan, and A. P. Byers
1996 "Efficacy, Safety, and Reversibility of a Bisdiamine Male-directed Oral Contraceptive in Gray Wolves (*Canis lupus*)." *Journal of Zoo and Wildlife Medicine* 27:501-506.
- Aspden, W. J., A. Rao, P. T. Scott, I. J. Clark, T. E. Trigg, J. Walsh, and M. J. D'Occhio
1996 "Direct Actions of the Luteinizing Hormone-releasing Hormone Agonist, Deslorelin, on Anterior Pituitary Contents of Luteinizing Hormone (LH) and Follicle-Stimulating Hormone (FSH), LH and FSH Subunit Messenger Ribonucleic Acid, and Plasma Concentrations of LH and FSH in Castrated Male Cattle." *Biology of Reproduction* 55:386-92. Available on the Internet at <<http://www.biolreprod.org/cgi/reprint/55/2/386>>.
- Ataja, A. M., T. N. Barry, R. M. Hoskinson, and P. R. Wilson
1992 "Effects of Active Immunization on Growth and Plasma Hormone Concentrations in Red Deer Stags during their Second Year". *Journal of Agricultural Science* 118:371-377.
- Atkinson, S., W. G. Gilmartin, and B. L. Lasley
1993 "Testosterone Response to a Gonadotrophin-releasing Hormone Agonist in Hawaiian Monk Seals (*Monachus schauinslandi*)." *Journal of Reproduction and Fertility* 97:35-38
- Baker, D. L., M. A. Wild, M. D. Hussain, R. L. Dunn, and T. M. Nett
2005 "Evaluation of Remotely Delivered Leuprolide Acetate as a Contraceptive Agent in Female Elk (*Cervus elaphus nelsoni*)." *Journal of Wildlife Diseases*, 41(4): 758-767.
- Baker, D. L., T. M. Nett, N. T. Hobbs, R. B. Gill, and M. M. Miller
1999 "Evaluation of GnRH-toxin Conjugate as an Irreversible Contraceptive in Female Mule Deer." The Wildlife Society 6th Annual Conference, Austin, Texas, USA. pp61.
- Baker, D. L., M. A. Wild, M. M. Conner, H. B. Ravivarapu, R. L. Dunn, and T. M. Nett
2002 "Effects of GnRH Agonist (leuprolide) on Reproduction and Behavior in Female Wapiti (*Cervus elaphus nelsoni*)." *Reproduction Supplement* 60:155-167.
- 2004 "Gonadotropin-releasing Hormone Agonist: A New Approach to Reversible Contraception in Female Deer." *Journal of Wildlife Diseases* 40:713-24.

- Barber, M. R. and R. A. Fayrer-Hosken
2000 "Evaluation of Somatic and Reproductive Immunotoxic Effects of the Porcine Zona Pellucida Vaccination." *Journal of Experimental Zoology* 286:641-646.
- Barlow, N. D.
1997 "Modeling Immunocontraception in Disseminating Systems." *Reproduction Fertility and Development* 9:51-60.
- Barlow, N. D., J. M. Kean, and C. J. Briggs
1997 "Modeling the Relative Efficacy of Culling and Sterilization for Controlling Populations." *Wildlife Research* 24:129-141.
- Becker, S. E., W. J. Enright, and L. S. Katz
1999 "Active Immunization Against Gonadotropin-releasing Hormone in Female White-tailed Deer." *Zoo Biology* 18:385-396.
- Becker, S. E., and L. S. Katz
1994 "Effects of Exogenous Prostaglandin- $F_{2\alpha}$ (PGF $_{2\alpha}$) on Pregnancy Status in White-tailed Deer." *Zoo Biology* 13:315-323.
- 1995 "Effects of a Gonadotropin-releasing Hormone Agonist on Serum Luteinizing Hormone Concentrations in Female White-tailed Deer." *Small Ruminant Research* 18:145-150.
- 1997 "Gonadotropin-releasing Hormone (GnRH) Analogs or Active Immunization Against GnRH to Control Fertility in wildlife. In: Kreeger, T. J. ed. Contraception in Wildlife Management. USDA-APHIS Technical Bulletin 1853, Washington, D.C., USA.
- Beekman, N. J. C. M., W. M. M. Schaaper, J. A. Turkstra, and R. H. Meloen
1999 "Highly Immunogenic and Fully Synthetic Peptide-carrier Constructs Targeting GnRH." *Vaccine* 17:2043-2050.
- Bertschinger, H. J., C. S. Asa, P. P. Calle, J. A. Long, K. Bauman, K. DeMatteo, W. Jochle, T. E. Trigg, and A. Human
2001 "Control of Reproduction and Sex Related Behaviour in Exotic Wild Carnivores with the GnRH Analogue Deslorelin: Preliminary Observations." *Journal of Reproduction and Fertility Supplement* 57: 275-283.
- Bertschinger, H. J., T. E. Trigg, W. Jochle, and A. Human
2002 "Induction of Contraception in Some African Wild Carnivores by Down Regulation of LH and FSH Secretion Using the GnRH Analogue Deslorelin." *Reproduction Supplement* 60:41-52.
- Bickle, C. A., J. F. Kirkpatrick, and J. W. Turner
1991 "Contraception in Striped Skunks with Norplant® Implants." *Wildlife Society Bulletin* 19:334-338.
- Bilecki, M.
2009 Personal communication between Mike Bilecki, Natural Resource Manager, FIIS and Kristina Heister, Natural Resource Manager, VAFO on 3/10/2009 regarding the use of fertility control on FIIS.

- Bonneau, M., R. Dufour, C. Chouvet, C. Roulet, W. Meadus, and E. J. Squires
1994 "The Effects of Immunization Against Luteinizing Hormone-releasing Hormone on Performance, Sexual Development, and Levels of Boar Taint-related Compounds in Intact Male Pigs." *Journal of Animal Science* 72:14-20.
- Boone, J. L., and R. G. Wiegert
1994 "Modeling Deer Herd Management: Sterilization is a Viable Option." *Ecological Modeling* 72:175-186
- Bradley, M. P.
1997 "Immunocontraceptive Vaccines for Control of Fertility in the European Red Fox (*Vulpes vulpes*)." In: Kreeger, T. J. ed. *Contraception in Wildlife Management*. USDA-APHIS Technical Bulletin 1853, Washington, D.C., USA. pp 195-203.
- Bradley, M. P., L. A. Hinds, and P. H. Bird
1997 "A Bait-delivered Immunocontraceptive Vaccine for the European Red Fox (*Vulpes vulpes*) by the year 2002?" *Reproduction, Fertility, and Development* 9:111-116.
- Brooks, R. P., M. W. Flemming, and J. J. Kennelly
1980 "Beaver Colony Response to Fertility Control: Evaluating a Concept." *Journal of Wildlife Management* 44:568-575.
- Brown, B. W., P. E. Mattner, P. A. Carroll, E. J. Holland, D. R. Paull, R. M. Hoskinson, and R. D. G. Rigby
1994 "Immunization of Sheep Against GnRH Early in Life: Effects on Reproductive Function and Hormones in Rams." *Journal of Reproduction and Fertility* 101:15-21.
- Brown, R. G., W. D. Bowen, J. D. Eddington, W. C. Kimmins, M. Mezei, J. L. Parsons, and B. Pohajdak
1997 "Evidence for a Long-lasting Single Administration Contraceptive Vaccine in Wild Grey Seals." *Journal of Reproductive Immunology* 35:53-64.
- Concannon, P. W., A. Yeager, D. Frank, and A. Iyampillai
1990 "Termination of Pregnancy and Induction of Premature Luteolysis by the Antiprogestagen, Mifeprestone, in Dogs." *Journal of Reproduction and Fertility* 88:99-104.
- Conner, M. M., D. L. Baker, M. A. Wild, J. G. Powers, M. D. Hussain, and R. L. Dunn
2007 "Fertility Control in Free-ranging Elk Using Gonadotropin-Releasing Hormone Agonist Leuprolide: Effects on Reproduction, Behavior, and Body Condition. *Journal of Wildlife Management*, 71:2346-2356.
- Cowan, P., R. Pech, and P.D. Curtis.
2002 "Field Applications of Fertility Control for Wildlife Management." *Conservation Biology 8: Reproduction and Integrated Conservation Science*. Cambridge University Press.

- Curtis, P. D., M. E. Richmond, L. A. Miller, and F. W. Quimby
2007 "Pathophysiology of White-tailed Deer Vaccinated with Porcine Zona Pellucida Immunocontraceptive." *Vaccine* 25: 4623-4630.
- 2008 "Physiological Effects of Gonadotropin-releasing Hormone Immunocontraception on White-tailed Deer." *Human-Wildlife Conflicts* 2(1): 68-79.
- Curtis, P. D., R. L. Pooler, M. E. Richmond, L. A. Miller, G. F. Mattfeld, and F. W. Quimby
2002 "Comparative Effects of GnRH and Porcine Zona Pellucida (PZP) Immunocontraceptive Vaccines for Controlling Reproduction in White-tailed Deer (*Odocoileus virginianus*). *Reproduction Supplement* 60:131-141.
- Curtis, P.D., A.N. Moen, and M.E. Richmond
1998 "When Should Fertility Control be Applied?" Workshop on the status and future of wildlife fertility control. The Wildlife Society, Buffalo, New York.
- Daels, P. F., and J. P. Hughes
1995 "Fertility Control Using Intrauterine Devices: An Alternative for Population Control in Wild Horses." *Theriogenology* 44:629-639.
- Dalin, A. M., O. Andresen, and L. Malmgren
2002 "Immunization Against GnRH in Mature Mares: Antibody Titres, Ovarian Function, Hormonal Levels and Oestrous Behaviour." *Journal of Veterinary Medicine Series* 49:125-131.
- Davis, S. A., and R. P. Pech
2002 "Dependence of Population Response to Fertility Control on the Survival of Sterile Animals and their Role in Regulation." *Reproduction Supplement* 60:89-103.
- Deigert, F. A., A. E. Duncan, K. M. Frank, R. O. Lyda, and J. F. Kirkpatrick
2003 "Immunocontraception of Captive Exotic Species III. Contraception and Populations Management of Fallow Deer (*Cervus dama*)." *Zoo Biology* 22:261-268.
- de Jersey, J., P. H. Bird, N. K. Verma, and M. P. Bradley
1999 "Antigen-specific Systemic and Reproductive Tract Antibodies in Foxes Immunized with *Salmonella Typhimurium* Expressing Bacterial and Sperm Proteins." *Reproduction Fertility and Development* 11:219-228.
- DeLiberto, T. J., A. Seglund, W. Jochle, and B. Kimball
2002 "Assessment of Cabergoline as a Reproductive Inhibitor in Coyotes (*Canis latrans*)." *Reproduction Supplement* 60:53-64.
- DeNicola, A. J., D. J. Kesler, and R. K. Swihart
1997a "Dose Determination and Efficacy of Remotely Delivered Norgestomet Implants on Contraception of White-tailed Deer." *Zoo Biology* 16:31-37.

- 1997b "Remotely Delivered Prostaglandin F_{2α} Implants Terminate Pregnancy in White-tailed Deer." *Wildlife Society Bulletin* 25:527-531.
- DeNicola, A. J. and R. K. Swihart
1997 "Capture-induced Stress in White-tailed Deer." *Wildlife Society Bulletin* 25(2):500-3.
- D'Occhio, M. J., W. J. Aspden, and T. R. Whyte
1996 "Controlled, Reversible Suppression of Oestrous Cycles in Beef Heifers and Cows Using Agonists of Luteinizing Hormone Gonadotropin-Releasing Hormone." *Journal of Animal Science* 74:218-25.
- Dowsett, K. F., U. Tshewang, L. M. Knott, A. E. Jackson, and T. E. Trigg
1993 "Immunocastration of Colts and Immunospeying of Fillies." *Immunology and Cell Biology* 71:501-508.
- Dunshea, F. R., C. Colantoni, K. Howard, I. McCauley, P. Jackson, K. A. Long, S. Lopaticki, E. A. Nugent, J. A. Simons, J. Walker, and D. P. Hennessy
2001 "Vaccination of Boars with a GnRH Vaccine (Improvac) Eliminates Boar Taint and Increases Growth Performance. *Journal of Animal Science* 79:2524-2535.
- Eilts, B. E.
2002 "Pregnancy Termination in the Bitch and Queen." *Clinical Techniques in Small Animal Practice* 17:116-123.
- Fagerstone, K. A., M. A. Coffey, P. D. Curtis, R. A. Dolbeer, G. J. Killian, L.A. Miller, and L. M. Wilmot
2002 "Wildlife Fertility Control." *Wildlife Society Technical Review* 02-2, 29 pp.
- Fagerstone, K.A., L.A. Miller, J.D. Eisemann, J.R. O'Hare, and J.P. Gionfriddo
2008 "Registration of Wildlife Contraceptives in the United States of America, with OvoControl and GonaCon Immunocontraceptive Vaccines as Examples." *Wildlife Research* 35, 586-592.
- Fahim, M. S., M. Wang, M. F. Sutcu, Z. Fahim, and R. S. Youngquist
1993 Sterilization of Dogs with Intra-epididymal Injection of Zinc Arginine." *Contraception* 47: 107-122.
- Ferro, V. A., R. Costa, K. C. Carter, M. J. A. Harvey, M. M. Waterston, A. B. Mullen, C. Matschke, J. F. S. Mann, A. Colston, and W. H. Stimson
2004a "Immune Responses to a GnRH-based Anti-fertility Immunogen, Induced by Different Adjuvants and Subsequent Effect on Vaccine Efficacy." *Vaccine* 22:1024-1031.
- Ferro, V. A., M. A. H. Khan, D. McAdam, A. Colston, E. Aughey, A. B. Mullen, M. M. Waterston, and M. J. A. Harvey
2004b "Efficacy of an Anti-fertility Vaccine Based on Mammalian Gonadotrophin Releasing Hormone (GnRH-I) – a Histological Comparison in Male Animals." *Veterinary Immunology and Immunopathology* 101:73-86.

- Fraker, M. A., R. G. Brown, G. E. Gaunt, J. A. Kerr, and B. Pohajdak
2002 "Long Lasting, Single Dose Immunocontraception of Feral Fallow Deer in British Columbia." *Journal of Wildlife Management* 66(4):1141-1147.
- Fraker, M. A. and U. Bechert
2007 "SpayVac®—A Long-lasting, Single-dose PZP Contraceptive Vaccine for Practical Wildlife Population Control." Abstract. 6th International Conference on Fertility Control for Wildlife. September 3-5, 2007.
- Fraker, M. A.
2009 "Personal communication between M. A. Fraker and Kristina Heister, Natural Resource Manager, Valley Forge National Historical Park, National Park Service, regarding SpayVac® use in white-tailed deer.
- Frank, K. M., R. O. Lyda, and J. F. Kirkpatrick
2005 "Immunocontraception of Captive Exotic Species IV. Species Differences in Response to the Porcine Zona Pellucida Vaccine, Timing of Booster Inoculations, and Procedural Failures." *Zoo Biology* 0:1-10.
- Freudenberger, D. O., P. R. Wilson, T. N. Barry, Y. X. Sun, R. W. Purchas, and T. E. Trigg
1993 "Effects of Immunization Against GnRH Upon Body Growth, Voluntary Food Intake and Plasma Hormone Concentration in Yearling Red Deer Stags (*Cervus elaphus*)." *Journal of Agricultural Sciences* 121:381-388.
- Fromme, B., P. Eftekhari, M. Van Regenmortel, J. Hoebeke, A. Katz, and R. Millar
2003 "A Novel Retro-inverso Gonadotropin-releasing Hormone (GnRH) Immunogen Elicits Antibodies that Neutralize the Activity of Native GnRH." *Endocrinology* 144:3262-3269.
- Garrott, R.A.
1991 "Feral Horse Fertility Control: Potential and Limitations." *Wildlife Society Bulletin* 19, 52-58.
- 1995 "Effective Management of Free-ranging Ungulate Populations Using Contraception." *Wildlife Society Bulletin* 23, 445-452.
- Garrott, R. A., J. G. Cook, M. M. Bernoco, J. F. Kirkpatrick, L. L. Cadwell, S. Cherry, and B. Tiller
1998 "Antibody Response of Elk Immunized with Porcine Zona Pellucida." *Journal of Wildlife Disease* 34:539-546.
- Garrott, R. A and D. B. Siniff
1992 "Limitations of Male-oriented Contraception for Controlling Feral Horse Populations." *Journal of Wildlife Management* 56:456-464.

- Garza, F., D. L. Thompson, D. D. French, J. J. Wiest, R. L. St. George, K. B. Ashley, L. S. Jones, P. S. Mitchell, and D. R. McNeill
1986 "Active Immunization of Intact Mares Against Gonadotropin-releasing Hormone: Differential Effects on Secretion of Luteinizing Hormone and Follicle-stimulating Hormone." *Biology of Reproduction* 35:347-352.
- Gorman, S. P., J. K. Levy, A. L. Hampton, W. R. Collante, A. L. Harris, and R. G. Brown
2002 "Evaluation of a Porcine Zona Pellucida Vaccine for the Immunocontraception of Domestic Kittens (*Felis catus*). *Theriogenology* 58:135-149.
- Gross, J. E.
2000 "A Dynamic Simulation Model for Evaluating Effects of Removal and Contraception on Genetic Variation and Demography of Pryor Mountain Wild Horses." *Biological Conservation* 96:319-330.
- Haight, R. G., and L. D. Mech
1997 "Computer Simulation of Vasectomy for Wolf Control." *Journal of Wildlife Management* 61:1023-1031.
- Hardy, C. M., G. Clydesdale, K. J. Mobbs, J. Pekin, M. L. Lloyd, C. Sweet, G. R. Shellman, and M. A. Lawson
2004 "Assessment of Contraceptive Vaccines Based on Recombinant Mouse Sperm Protein PH20." *Reproduction* 127:325-334.
- Harrenstien, L. A., L. Munson, L. M. Chassy, I. K. M. Liu, and J. F. Kirkpatrick
2004 "Effects of Porcine Zona Pellucida Immunocontraceptives in Zoo Felids." *Journal of Zoo and Wildlife Medicine* 35:271-279.
- Hazum, E., and P. M. Conn
1988 "Molecular Mechanisms of Gonadotropin Releasing Hormone (GnRH) Action: I. The GnRH Receptor." *Endocrine Review* 9 (4): 379-86.
- Heilmann, T. J., R. A. Garrott, L. L. Cadwell, and B. L. Tiller
1998 "Behavioral Response of Free-ranging Elk Treated with an Immunocontraceptive Vaccine." *Journal of Wildlife Management* 62:243-250.
- Heister, K. M.
2009 Personal communication from Kristina M. Heister, Natural Resource Manager, Valley Forge National Historical Park regarding personal observation of fawns with spots observed at least once during fall spotlight counts for deer generally conducted during the 2nd and 3rd weeks in October.
- Hobbs, N. T., D. C. Bowden, and D. L. Baker
2000 "Effects of Fertility Control on Populations of Ungulates: General, Stage Structured Models." *Journal of Wildlife Management* 64:473-491.

- Hone, J.
1992 "Rate of Increase and Fertility Control." *Journal of Applied Ecology* 29:695-698.
- Hsu, C. T., C. Y. Ting, C. J. Ting, T. Y. Chen, C. P. Lin, J. Whang-Peng, and J. Hwang
2000 "Vaccination Against Gonadotropin-releasing Hormone (GnRH) Using Toxin Receptor-binding Domain-conjugated GnRH Repeats." *Cancer Research* 60:3701-3705.
- Jacob J., J. Matulessy, and Sudarmaji
2004 "Effects of Imposed Sterility on Movement Patterns of Female Ricefield Rats." *Journal of Wildlife Management* 68:1138-1144.
- Jacobsen, N. K., D. A. Jessup, and D. J. Kesler
1995 "Contraception in Captive Black-tailed Deer by Remotely Delivered Norgestomet Ballistic Implants." *Wildlife Society Bulletin* 23:718-722.
- Jewgenow, K., M. Quest, W. Elger, T. B. Hildebrandt, H. H. D. Meyer, G. Strauss, and F. Gortiz
2001 "Administration of Antiprogestin J956 for Contraception in Bears: A Pharmacological Study." *Theriogenology* 56:601-611.
- Jöchle, W., and M. Jöchle
1993 "Reproduction in a Feral Cat Population and its Control With a Prolactin Inhibitor Cabergoline." *Journal of Reproduction and Fertility Supplement* 47:419-424.
- Kennelly, J. J., and K. A. Converse
1997 "Surgical Sterilization: An Underutilized Procedure for Evaluating the Merits of Induced Sterility." In: Kreeger, T. J. ed. *Contraception in Wildlife Management*. USDA-APHIS Technical Bulletin 1853, Washington, D.C., USA. pp21-27.
- Kerr, P. J., R. J. Jackson, A. J. Robinson, J. Swan, L. Silvers, N. French, H. Clarke, D. F. Hall, and M. K. Holland
1999 "Infertility in Female Rabbits (*Oryctolagus cuniculus*) Alloimmunized with the Rabbit Zona Pellucida Protein ZPB Either as a Purified Recombinant Protein or Expressed by Recombinant Myxoma Virus." *Biology of Reproduction* 61:606-613.
- Kesler, D.
1997 "Remotely Delivered Contraception with Needle-less Norgestomet Implants." In: Kreeger, T. J. ed. *Contraception in Wildlife Management*. USDA-APHIS Technical Bulletin 1853, Washington, D.C., USA pp171-184.
- Killian, G., D. Wagner, and L. A. Miller
2006 "Observation on the Use of the GnRH Vaccine GonaCon™ in Male White-tailed Deer." *Wildlife Damage Management Conference* 11:256-63.

- Killian, G., J. Eisemann, D. Wagner, J. Werner, D. Shaw, R. Engeman, and L. Miller
 2006a "Safety and Toxicity Evaluation of GonaCon™ Immunocontraceptive Vaccine in White-tailed Deer." *Vertebrate Pest Conference* 22:82-87.
- Killian, G., D. Wagner, K. Fagerstone, and L. Miller
 2008 "Long-term Efficacy and Reproductive Behavior Associated with GonaCon™, Use in White-tailed Deer (*Odocoileus virginianus*). *Proceedings of the 23rd Vertebrate Pest Conference, University of California, Davis*.
- Killian, G., L. Miller, N. K. Diehl, J. Rhyhan, and D. Thain
 2004 "Evaluation of Three Contraceptive Approaches for Population Control of Wild Horses." *Proceedings of the Vertebrate Pest Conference* 21:263-268.
- Killian, G., L. Miller, J. Rhyhan, and H. Doten
 2006b "Immunocontraception of Florida Feral Swine with a Single-dose GnRH Vaccine." *American Journal of Reproductive Immunology* 55:378-384.
- Killian, G. J., and L. A. Miller
 2001 "Behavioral Observations and Physiological Implications for White-tailed Deer Treated with Two Different Immunocontraceptives." *Proceedings of the Ninth Wildlife Damage Management Conference*. October 5-8, 2000. The Pennsylvania State University. University Park, PA.
- Killian, G., N. Diehl, L. Miller, J. Rhyhan, and D. Thain
 2006c "Long-term Efficacy of Three Contraceptive Approaches for Population Control of Wild Horses." In Timm, R.M., and J. M. O'Brien, eds. *Proceedings of the 22nd Vertebrate Pest Conference* 22:67-71.
- Kilpatrick, H. J., S. M. Spohr, and A. J. DeNicola
 1997 "Darting Urban Deer: Techniques and Technology." *Wildlife Society Bulletin* 25 (2): 542-46.
- Kilpatrick, H. J., and W. D. Walter
 1997 "Urban Deer Management: A Community Vote." *Wildlife Society Bulletin* 25:388-91.
- Kirkpatrick, J. F., I. K. M. Liu, J. W. Turner, R. Naugle, and R. Keiper
 1992 "Long term Effects of Porcine Zona Pellucidae Immunocontraception on Ovarian Function in Feral Horses (*Equus caballus*)." *Journal of Reproduction and Fertility* 94:437-44.
- Kirkpatrick, J. F. and A. Turner
 2008 "Achieving Population Goals in a Long-lived Wildlife Species (*Equus caballus*) with Contraception." *Wildlife Research* 35:513-519.

- Kirkpatrick, J. F.
2007 "Measuring the Effects of Wildlife Contraception: The Argument for Comparing Apples with Oranges." *Reproductive Fertility Development* 19:548-552.
- Kirkpatrick, J. F., P. P. Calle, P. Kalk, I. K. M. Liu, and J. W. Turner
1996a "Immunocontraception of Captive Exotic Species. II. Formosan Sika Deer (*Cervus Nippon Taiouanus*), Axis Deer (*Cervus axis*), Himalayan Tahr (*Hemitragus jemlahicus*), Roosevelt Elk (*Cervus elaphus roosevelti*), Reeves' Muntjac (*Muntiacus reevesi*), and Sambar Deer (*Cervus unicolor*)." *Journal of Zoo and Wildlife Medicine* 27:482-495.
- Kirkpatrick, J. F., I. K. M. Liu, and J. W. Turner Jr.
1990 "Remotely-delivered Immunocontraception in Feral Horses." *Wildlife Society Bulletin* 18:326-330
- Kirkpatrick, J. F., R. Naugle, I. K. M. Liu, M. Bernoco, and J. Turner
1995 "Effects of Seven Consecutive Years of Porcine Zona Pellucidae Contraception on Ovarian Function in Feral Mares." *Biology of Reproduction Monograph Series* 1:411-418.
- Kirkpatrick, J. F., and A. Turner
2003 "Absence of Effects from Immunocontraception on Seasonal Birth Patterns and Foal Survival Among Barrier Island Wild Horses." *Journal of Applied Animal Welfare Science* 6:301-308.
- Kirkpatrick, J. F. and J. W. Turner Jr.
1985 "Chemical Fertility Control and Wildlife Management." *BioScience* 35:485-491
- 1991 "Reversible Contraception in Nondomestic Animals." *Journal of Zoo and Wildlife Medicine* 22:392-408.
- 2002 "Reversibility of Action and Safety During Pregnancy of Immunization Against Porcine Zona Pellucida in Wild Mares (*Equus caballus*)." *Reproduction Supplement* 60:197-202.
- Kirkpatrick, J. F., J. W. Turner Jr., I. K. M. Liu, and R. Fayer-Hosken
1996b "Applications of Pig Zona Pellucida Immunocontraception to Wildlife Fertility Control." *Journal of Reproduction and Fertility Supplement* 50:183-189.
- Kirkpatrick, J. F., J. W. Turner Jr., I. K. M. Liu, R. Fayer-Hosken, and A. T. Rutberg
1997 "Case Studies in Wildlife Immunocontraception: Wild and Feral Equids and White-tailed Deer." *Reproductive Fertility and Development* 9: 105-110.
- Knox, W. M., K. V. Miller, and R. L. Marchinton
1988 "Recurrent Estrous Cycles in White-tailed Deer." *Journal of Mammalogy* 69:384-86.

- Kovacs, M., A. V. Schally, A. Nagy, M. Koppan, and K. Groot
1997 "Recovery of Pituitary Function after Treatment with a Targeted Cytotoxic Analog of Luteinizing Hormone-releasing Hormone." *Proceedings of the National Academy of Sciences* 94:1420-1425.
- Kreeger, T. J. ed.
1997 "Contraception in Wildlife Management." USDA-APHIS Technical Bulletin 1853, Washington, D.C., USA. 272pp.
- Ladd, A., G. Prabhu, Y. Y. Tsong, T. Probst, W. Chung, and R. B. Thau
1988 "Active Immunization Against Gonadotropin-releasing Hormone Combined with Androgen Supplementation is a Promising Antifertility Vaccine for Males." *American Journal of Reproductive Immunology and Microbiology* 17:121-127.
- Ladd, A., G., Y. Y. Tsong, A. M. Walfield, and R. Thau
1994 "Development of an Antifertility Vaccine for Pets Based on Active Immunization Against Luteinizing Hormone-releasing Hormone." *Biology of Reproduction* 51:1076-1083.
- Lengwinat, T., H. H. D. Meyer, and W. Jöchle
2001 "Effectiveness of Cabergoline for Termination of Pregnancy in Silver Fox (*Vulpes vulpes fulva*)." *Reproduction in Domestic Animals* 36:257-260.
- Levy, J. K., L. A. Miller, P. C. Crawford, J. W. Ritchey, M. K. Ross, and K. A. Fagerstone
2004 "GnRH Immunocontraception of Male Cats." *Theriogenology* 62(6):1116-1130.
- Lincoln, G. A.
1987 "Long-term Stimulatory Effects of a Continuous Infusion of LHRH Agonist on Testicular Function in Male Red Deer (*Cervus elaphus*)." *Journal of Reproduction and Fertility* 80:257-261.
- Lincoln, G. A., H. M. Fraser, and T. J. Fletcher
1982 "Antler Growth in Male Red Deer (*Cervus elaphus*) after Active Immunization Against LH-RH." *Journal of Reproduction and Fertility* 66:703-708.
- Liu, I. K. M., J. W. Turner, E. M. G. Van Leeuwen, D. R. Flanagan, J. L. Hedrick, K. Murata, V. M. Lane, and M. P. Morales-Levy
2005 "Persistence of Anti-zonae Pellucidae Following a Single Inoculation of Porcine Zonae Pellucidae in the Domestic Equine." *Reproduction* 129:181-190.
- Locke, S. L., M. W. Cook, L. A. Harveson, D. S. Davis, R. R. Lopez, N. J. Silvy, and M. A. Fraker
2007 "Effectiveness of SpayVac® for Reducing White-tailed Deer Fertility." *Journal of Wildlife Diseases* 43:726-730.
- Matschke, G. H.
1977a "Antifertility Action of Two Synthetic Progestins in Female White-tailed Deer." *Journal of Wildlife Management* 41: 194-196.

- 1977b "Fertility Control in White-tailed Deer by Steroid Implants." *Journal of Wildlife Management* 41:731-735.
- 1980 "Efficacy of Steroid Implants in Preventing Pregnancy in White-tailed Deer." *Journal of Wildlife Management* 44:756-758.
- Malmgren, L., O. Andresen, and A. M. Dalin
2001 "Effect of GnRH Immunization of Hormonal Levels, Sexual Behaviour, Semen Quality and Testicular Morphology in Mature Stallions." *Equine Veterinary Journal* 33:75-83.
- McCue, P. M., V. J. Farquhar, and E. L. Squires
2000 "Effect of the GnRH Agonist Deslorelin Acetate on Pituitary Function and Follicular Development in the Mare." *Reproduction* 46:355-356.
- McCullough, D.R.
1996 "Demography and Management of Wild Populations by Reproductive Intervention." In *Contraception in Wildlife*. The Edwin Mellen Press, Lewiston, New York.
- McShea, W. J., S. L. Monfort, S. Hakim, J. Kirkpatrick, I. Liu, J. W. Turner, Jr., L. Chassy, and L. Munson
1997 "The Effect of Immunocontraception on the Behavior and Reproduction of White-tailed Deer." *Journal of Wildlife Management* 61:560-569.
- McShea, W. J., and J. H. Rappole
1997 "Herbivores and the Ecology of Forest Understory Birds." Pp. 298-309 in W. J. McShea, H. B. Underwood and J. H. Rappole (eds.), *The Science of Overabundance, Deer Ecology and Population Management*. Washington, D.C.: Smithsonian Institution Press.
- Meloan, R. H., J. A. Turkstra, H. Lankhof, W. C. Puijk, W. M. M. Schaaper, G. Dijkstra, C. J. G. Wensing, and R. B. Oonk
1994 "Efficient Immunocastration of Male Piglets by Immunoneutralization of GnRH Using a New GnRH-like Peptide." *Vaccine* 12:741-746.
- Merrill, J. A., E. G. Cooch, and P. D. Curtis
2003 "Time to Reduction: Factors Influencing Management Efficacy in Sterilizing Overabundant White-tailed Deer." *Journal of Wildlife Management* 67:267-279.
- 2006 "Managing an Overabundant Deer Population by Sterilization: Effects of Immigration, Stochasticity, and the Capture Process." *Journal of Wildlife Management* 70:268-277.
- Miller, L. A., and K. A. Fagerstone
2000 "Induced Infertility as a Wildlife Management Tool." *Proceedings of the Vertebrate Pest Conference* 19:160-168.

- Miller, L. A., B. E. Johns, and D. J. Elias
1998 "Immunocontraception as a Wildlife Management Tool: Some Perspectives." *Wildlife Society Bulletin* 26: 237-243.
- Miller, L. A., B. E. Johns, D. J. Elias and K. A. Crane
1997 "Comparative Efficacy of Two Immunocontraceptive Vaccines." *Vaccine*. 15:1858-1862.
- Miller, L. A., B. E. Johns, and G. J. Killian
2000a "Immunocontraception of White-tailed Deer Using Native and Recombinant Zona Pellucida Vaccines." *Animal Reproduction Science* 63:187-195.
- 2000b "Long-term Effects of PZP Immunization on Reproduction in White-tailed Deer." *Vaccine* 18:568-574.
- 2000c "Immunocontraception of White-tailed Deer with GnRH Vaccine." *American Journal of Reproductive Immunology* 44:266-274.
- Miller, L. A., K. Crane, S. Gaddis, and G. J. Killian
2001 "Porcine Zona Pellucida Immunocontraception: Long-term Health Effects on White-tailed Deer." *Journal of Wildlife Management* 65 (4): 941-5.
- Miller, L. A and G. J. Killian
2002 "In Search of the Active PZP Epitope in White-tailed Deer Immunocontraception." *Vaccine* 20:2735-2742.
- Miller, L. A, J. C. Rhyan, and M. Drew
2004 "Contraception of Bison by GnRH Vaccine: A Possible Means of Decreasing Transmission of Brucellosis in Bison." *Journal of Wildlife Diseases* 40:725-730.
- Miller, L. A, J. C. Rhyan, and G. Killian
2003 "Evaluation of GnRH Contraceptive Vaccine Using Domestic Swine as a Model for Feral Hogs." *Proceedings of the Wildlife Damage Management Conference* 10:120-127.
- Miller, L. A, J. P. Gionfriddo, K. A. Fagerstone, J. C. Rhyan, and G. J. Killian
2008 "The Single-shot GnRH Immunocontraceptive Vaccine (GonaConTM) in White-tailed Deer: Comparison of Several GnRH Preparations." *Am J Reprod Immunol*. 60: 214-223.
- Miller, L. A, K. A. Fagerstone, D. C. Wagner, and G. J. Killian
2009 "Factors Contributing to the Success of a Single-shot, Multiyear PZP Immunocontraceptive Vaccine for White-tailed Deer." *Human-Wildlife Conflicts* 3(1): 103-115.
- Molenaar, G. J., C. Lugard-Kok, R. H. Meloen, R. B. Oonk, J. de Koning, and C. J. G. Wensing
1993 "Lesions in the Hypothalamus after Active Immunization Against GnRH in the Pig." *Journal of Neuroimmunology* 48:1-12.

- Moore, H. D. M., N. M. Jenkins and C. Wong
1997 "Immunocontraception in Rodents: A Review of the Development of a Sperm Based Immunocontraceptive Vaccine for the Grey Squirrel (*Sciurus carolinensis*).” *Reproduction Fertility and Development* 9:125-129.
- Morell, V.
1993 "Australian Pest Control by Virus Causes Concern.” *Science* 261:683-684.
- Muller, L. I., R. J. Warnen, and D. L. Evans
1997 "Theory and Practice of Immunocontraception in Wild Animals.” *Journal of Wildlife Management* 25 (2): 504-14.
- Munson, L.
2006 "Contraception in Felids.” *Theriogenology* 66:126-134.
- Munson, L., J. E. Bauman, C. S. Asa, W. Jöchle, and T. E. Trigg
2001 "Efficacy of the GnRH Analogue Deslorelin for Suppression of Oestrous Cycles in Cats.” *Journal of Reproduction and Fertility* 57 Supplement: 269-273.
- Munson, L., A. Gardner, R. J. Mason, L. M. Chassy, and U. S. Seal
2002 "Endometrial Hyperplasia and Mineralization in Zoo Felids Treated with Melengestrol Acetate Contraceptives.” *Veterinary Pathology* 39: 419-427.
- Murty, T.S. and G.A. Sastry
1978 "Effect of Cadmium Chloride (CdCl_2) Injection on the Histopathology of the Testis and the Prostate in Dogs. I. Intratesticular Procedure.” *Indian Veterinary Journal* 55:368-371.
- Naugle, R. E., A. T. Rutberg, H. B. Underwood, J. W. Turner, Jr., and I. K. M. Liu
2002 "Field testing of Immunocontraception on White-tailed Deer (*Odocoileus virginianus*) on Fire Island National Seashore, New York, USA.” *Reproduction Supplement* 60:143-153
- Nett, T. M., M. C. Allen, M. Wiczorek, and L. M. Glode
1999 "A Gonadotropin-releasing Hormone Agonist (GnRH-A) Linked to Pokeweed Antiviral Protein (PAP) Decreases the Ability of the Pituitary Gland to Secrete LH.” *Biology of Reproduction* 60 Supplement 1:227.
- Nash, P. B., J. K. James, L. T. Hui, and L. A. Miller
2004 "Fertility Control of California Ground Squirrels Using GnRH Immunocontraception.” *Proceedings of the 21st Vertebrate Pest Conference* pp274-278.
- Nshimura, N., N. Kawate, T. Sawada, and J. Mori
1992 "Chemical Castration by a Single Intratesticular Injection of Lactic Acid in Rats and Dogs.” *Journal of Reproduction and Development* 38:263-266.

- Onclin, K., and J. P. Verstegen
1996 "Practical Use of a Combination of a Dopamine Agonist and a Synthetic Prostaglandin Analogue to Terminate Unwanted Pregnancy in Dogs." *Journal of Small Animal Practice* 37:211-216.
- Oonk, H. B., J. A. Turkstra, W. M. M. Schaaper, J. H. F. Erkens, M. H. Schuitemaker-de Weerd, A. van Nes, J. H. M. Verheijden, and R. H. Meloen
1998 "New GnRH-like Peptide Construct to Optimize Efficient Immunocastration of Male Pigs by Immunoneutralization of GnRH." *Vaccine* 16:1074-1082.
- Pennsylvania Game Commission (PGC)
2009 Letter to Kristina Heister, Natural Resource Manager, VAFO from Carl G. Roe, Executive Director, Pennsylvania Game Commission on 2/13/09 regarding marking of individual animals if fertility control products are used.
- Pineda, M. H. and D. I. Hepler
1981 "Chemical Vasectomy in Dogs. Long-term Study." *Theriogenology* 16:1-12.
- Plotka, E. D., and U. S. Seal
1989 "Fertility Control in Female White-tailed Deer." *Journal of Wildlife Disease* 25:643-646.
- Plotka, E. D., D. N. Vevea, T. C. Eagle, D. B. Siniff, and J. R. Tester
1989 "Ovarian Function in Captive Feral Mares." *Journal of Wildlife Diseases* 25:574-579.
- Porter, W. F., H. B. Underwood, and J. L. Woodward
2004 "Movement Behavior, Dispersal, and the Potential for Localized Management of Deer in a Suburban Environment." *Journal of Wildlife Management* 68:247-256.
- Powell, D. M.
1999 "Preliminary Evaluation of Porcine Zona Pellucida (PZP) Immunocontraception for Behavioral Effects in Feral Horses (*Equus caballus*)." *Journal of Applied Animal Welfare Science* 2:321-335.
- Rabb, M. H., D. L. Thompson, Jr., B. E. Barry, D. R. Colborn, K. E. Hehnke, and F. Garza, Jr.
1990 "Effects of Active Immunization Against GnRH on LH, FSH, and Prolactin Storage, Secretion, and Response to their Secretagogues in Pony Geldings." *Journal of Animal Science* 68:3322-3329.
- Raphael, B. L., P. Kalk, P. Tomas, P. P. Calle, J. G. Doherty, and R. A. Cook
2003 "Use of Melengesterol Acetate in Feed for Contraception in Herds of Captive Ungulates." *Zoo Biology* 22:455-463.
- Ringleb, J., M. Rohleder, and K. Jewgenow
2004 "Impact of Feline Zona Pellucida Glycoprotein B-derived Synthetic Peptides on In Vitro Fertilization of Cat Oocytes." *Reproduction* 127:179-186.

- Robbins, S. C., J. M. Jelinski, and R. L. Stotish
2004 "Assessment of the Immunological and Biological Efficacy of Two Different Doses of a Recombinant GnRH Vaccine in Domestic Male and Female Cats (*Felis catus*).” *Journal of Reproductive Immunology* 64:107-119.
- Rudolph, B. A., W. F. Porter, and H. B. Underwood
2000 "Evaluating Immunocontraception for Managing Suburban White-tailed Deer in Irondequoit, New York.” *Journal of Wildlife Management* 64:463-473.
- Rutberg, A.
2009 Email communication to Kristina Heister, Natural Resource Manager, Valley Forge National Historical Park regarding updated results of research being conducted on one-shot, multi-year PZP vaccine on Fripp Island, SC. March 25, 2009.
- Rutberg, A. T. and R. E. Naugle
2009 "Testing the Effectiveness of One-shot Immunocontraceptives on White-tailed Deer at Fripp Island, South Carolina.” 2008 Progress Report. South Carolina Department of Natural Resources. Unpublished.
- Rutberg, A. T. and R. E. Naugle
2008a "Population-level Effects of Immunocontraception in White-tailed Deer (*Odocoileus virginianus*).” *Wildlife Research* 35: 494-501.
- 2008b "Deer-vehicle Collision Trends at a Suburban Immunocontraception Site.” *Human-Wildlife Conflicts* 2(1): 60-67.
- Rutberg, A. T., R. E. Naugle, L. A. Thiele, and I. K. M. Liu
2004 "Effects of Immunocontraception on a Suburban Population of White-tailed deer *Odocoileus virginianus*.” *Biological Conservation* 116:243-250.
- Sabeur, K., B. A. Ball, T. M. Nett, H. H. Ball, and I. K. M. Liu
2003 "Effect of GnRH Conjugated to Pokeweed Antiviral Protein on Reproductive Function in Adult Male Dogs.” *Reproduction* 125:801-806
- Safir, J. M., R. G. Loy, and B. P. Fitzgerald
1987 "Inhibition of Ovulation in the Mare by Active Immunization Against LHRH.” *Journal of Reproduction and Fertility* 35:229-237.
- Sankai, T., T. Endo, K. Kanayama, Y. Sakuma, M. Umezu, and J. Masaki
1991 "Antiprogesterone Compound, RU486 Administration to Terminate Pregnancy in Dogs and Cats.” *Journal of Veterinary Medical Science* 53:1069-1070.
- Seagle, S. W., and J. D. Close
1996 "Modeling White-tailed Deer *Odocoileus virginianus* Population Control by Contraception.” *Biological Conservation* 76:87-91.

- Shideler, S. E., M. A. Stoops, N. A. Gee, J. A. Howell, and B. L. Lasley
2002 "Use of Procine Zona Pellucida (PZP) Vaccine as a Contraceptive Agent in Free-ranging Tule Elk (*Cervus elaphus nannodes*)."
Reproduction Supplement 60:169-176.
- Skinner, S. M., G. J. Killian, L. A. Miller, and B. S. Dunbar
1994 "Characteristics of Antigenicity and Immunogenicity Patterns of Native and Recombinant Zona Pellucida Proteins in the White-tailed Deer." *Journal of Reproduction and Fertility* 101:295-303.
- Skinner, S. M., T. Mills, H. J. Kirchick, and B. S. Dunbar
1984 "Immunization with Zona Pellucida Proteins in Abnormal Ovarian Follicular Differentiation and Inhibition of Gonadotropin-induced Steroid Secretion." *Endocrinology* 115:2418-2432.
- Stith, C., and M. D. Hussain
2003 "Determination of Mifepristone Levels in Wild Canid Serum Using Liquid Chromatography." *Journal of Chromatography B* 794:9-15.
- Stout, T. A. E., and B. Colenbrander
2004 "Suppressing Reproductive Activity in Horses Using GnRH Vaccines, Antagonists or Agonists." *Animal Reproduction Science* 82-83:633-643.
- Suri, A.
2004 "Sperm Specific Proteins- Potential Candidate Molecules for Fertility Control." *Reproductive Biology and Endocrinology* 2: pp 6.
2005 "Contraceptive Vaccines Targeting Sperm." *Expert Opinion on Biological Therapy* 5:381-392.
- Tast, A., R. J. Love, I. J. Clarke, and G. Evans
2000 "Effects of Active and Passive Gonadotropin-releasing Hormone Immunization on Recognition and Establishment of Pregnancy in Pigs." *Reproduction Fertility and Development* 12:277-282.
- Trigg, T. E., P. J. Wright, A. F. Armour, P. E. Williamson, A. Junaidi, G. B. Martin, A. G. Doyle, and J. Walsh
2001 Use of a GnRH Analogue Implant to Produce Reversible Long-term Suppression of Reproductive Function in Male and Female Domestic Dogs." *Journal of Reproduction and Fertility Supplement* 57:255-261.
- Tshewang, U., K. F. Dowsett, L. M. Knott, and T. E. Trigg
1997 "Preliminary Study of Ovarian Activity in Fillies Treated with a GnRH Vaccine." *Australian Veterinary Journal* 75:663-667.
- Tung, K. S. K., P. Primakoff, L. Woolman-Gamer, and D. G. Myles
1997 "Mechanism of Infertility in Male Guinea Pigs Immunized with Sperm PH-20." *Biology of Reproduction* 56:1133-1141.

- Turkstra, J. A., H. B. Oonk, W. M. M. Schaaper, and R. H. Meloen
2002 "The Role of the Individual Amino Acids of a GnRH-tandem-dimer Peptide Used as an Antigen for Immunocastration of Male Piglets Determined with Systematic Alanine Replacements." *Vaccine* 20:406-412.
- Turkstra, J. A., F. J. U. M. van der Meer, J. Knaap, P. J. M. Rottier, K. J. Teerds, B. Colenbrander, and R. H. Meloen
2005 "Effects of GnRH Immunization in Sexually Mature Pony Stallions." *Animal Reproduction Science* 86:247-259.
- Turner, J. W., J. F. Kirkpatrick, and I. K. M. Liu
1996 "Effectiveness, Reversibility and Serum Antibody Titers Associated with Immunocontraception in Captive White-tailed Deer." *Journal of Wildlife Management* 60:45-51.
- Turner, J. W and J. F. Kirkpatrick
2002 "Effects of Immunocontraception on Population Longevity and Body Condition in Wild Mares (*Equus caballus*). *Reproduction Supplement* 60:187-195.
- Turner, J. W, I. K. M. Liu, and J. F. Kirkpatrick
1992 "Remotely Delivered Immunocontraception in Captive White-tailed Deer." *Journal of Wildlife Management* 56:154-157.
- Turner, J. W, I. K. M. Liu, D. R. Flanagan, K. S. Bynum, and A. T. Rutberg
2002 "Porcine Zona Pellucida (PZP) Immunocontraception of Wild Horses (*Equus caballus*) in Nevada: A 10 year Study." *Reproduction Supplement* 60:177-186.
- Turner, J. W., Jr., I. K. M. Liu, D. R. Flanagan, A. T. Rutberg, and J. F. Kirkpatrick
2007 "Immunocontraception in Wild Horses: One Inoculation Provides Two Years of Infertility." *The Journal of Wildlife Management* 71:662-7.
- Turner, J. W., Jr., I. K. M. Liu, A. T. Rutberg, and J. F. Kirkpatrick
1997 "Immunocontraception Limits Foal Production in Free-ranging Feral Horses in Nevada." *Journal of Wildlife Management* 61:873-880.
- Turner, J. W., A. T. Rutberg, R. E. Naugle, M. A. Kaur, D. R. Flanagan, H. J. Bertschinger, and I. K. M. Liu
2008 "Controlled-release Components of PZP Contraceptive Vaccine Extend Duration of Infertility." *Wildlife Research* 35: 555-562.
- Underwood, H. B.
2005 "White-tailed Deer Ecology and Management on Fire Island National Seashore." National Park Service Technical Report NPS/NER/NRTR-2005/022. National Park Service, Washington, D.C.
- U.S. Department of Agriculture (USDA)
2008 "GonaCon™ Birth Control for Deer: Questions and Answers." Animal and Plant Health Inspection Service, Wildlife Services. Fact Sheet. Available on the Internet at: <http://www.aphis.usda.gov/wildlife_damage/nwrc/research/reproductive_control/content/faq_gonacon_bc_deer_08.pdf>.

- Verdier, Y., G. Farre, N. Rouet, Z. Kele, T. Janaky, and F. Boue
2005 "Identification of a New, Testis-specific Sperm Antigen Localized on the Principal Piece of the Spermatozoa Tail in the Fox (*Vulpes vulpes*).” *Biology of Reproduction* 72:502-508.
- Vickery, B. H.
1986 "Comparison of the Potential for Therapeutic Utilities with Gonadotropin-releasing Hormone Agonists and Antagonists.” *Endocrine Review* 7:115-124.
- Vickery, B. H., G. I. McRae, W. Briones, A. Worden, R. Seidenberg, B. D. Schanbacher, and R. Falvo
1984 "Effects of LHRH Agonist Analog Upon Sexual Function in Male Dogs.” *Journal of Andrology* 5:28-42.
- Vickery, B. H., G. I. McRae, J. C. Goodpasture, and L. M. Sanders
1989 "Use of Potent LHRH Analogues for Chronic Contraception and Pregnancy Termination in Dogs.” *Journal of Reproduction and Fertility* 39:175-187.
- Von Berky, A. G., and W. L. Townsend
1993 "The Relationship Between the Prevalence of Uterine Lesions and the Use of Medroxyprogesterone Acetate for Canine Population Control.” *Australian Veterinary Journal* 70:449-250.
- Waddell, R. B., D. A. Osborn, R. J. Warren, J. C. Griffin, and D. J. Kesler
2001 "Prostaglandin F_{2α} -mediated Fertility Control in Captive White-tailed Deer.” *Wildlife Society Bulletin* 29:1067-1074.
- Walter, W. D., H. J. Kilpatrick, and M. A. Gregonis
2003 "Does Immunocontraception Improve Condition of Free-ranging Female White-tailed Deer?” *Journal of Wildlife Management* 67:762-766.
- Walter, W. D., P. J. Perkins, A. T. Rutberg, and H. J. Kilpatrick
2002a "Evaluation of Immunocontraception in a Free-ranging Suburban White-tailed Deer Herd.” *Wildlife Society Bulletin* 30:186-192.
- 2002b "Evaluation of Immunocontraceptive Adjuvants, Titers, and Fecal Pregnancy Indicators in Free-ranging White-tailed Deer.” *Wildlife Society Bulletin* 30:908-914.
- Wang, M.
2005 Neutersol: Intratesticular Injection Induces Sterility in Dogs. Available on the internet at: < <http://www.neutersol.com/Study.htm>>. Site accessed on June 22, 2005.
- Warren, R. J., R.A. Frayer-Kosken, R.A. Garrott, R.A. Jessup, D.A. Kirkpatrick, and J.F. Kirkpatrick
1992 "The Applicability of Contraceptives in the Elimination or Control of Exotic Mountain Goats from Olympic National Park.” Unpublished scientific panel review, January 1992. Olympic National Park, National Park Service.

- 2000 "Overview of Fertility Control in Urban Deer Management." In Proceedings of the 2000 Annual Conference for the Society of Theriogenology, 2 December 2000, San Antonio, Texas, 237–46. Nashville, TN: Society for Theriogenology.
- Weikel Jr., J.H., and L.W. Nelson
1977 "Problems in Evaluating Chronic Toxicity of Contraceptive Steroids in Dogs." *Journal of Toxicology and Environmental Health* 3:167-177.
- White, L. M., R. J. Warren, and R. A. Fayrer-Hosken
1994 "Levonorgestrel Implants as a Contraceptive in Captive White-tailed Deer." *Journal of Wildlife Diseases* 30:241-246.
- Yang, W. H., M. Wieczorck, M. C. Allen, and T. M. Nett
2003 "Cytotoxic Activity of Gonadotropin-releasing Hormone (GnRH)-pokeweed Antiviral Protein Conjugates in Cell Lines Expressing GnRH Receptors." *Endocrinology* 144:1456-1463.
- Yoder, C. A., W. F. Andelt, L. A. Miller, J. J. Johnston, and M. J. Goodall
2004 "Effectiveness of Twenty, Twenty-five Diazacholesterol, Avian Gonadotropin-releasing Hormone, and Chicken Riboflavin Carrier Protein for Inhibiting Reproduction in Coturnix Quail." *Poultry Science* 83:234-244.
- Zeng, W., S. Ghosh, Y. F. Lau, L. E. Brown, and D. C. Jackson
2002 "Highly Immunogenic and Totally Synthetic Pipopeptides as Self-adjuvanting Immunocontraceptive Vaccines." *Journal of Immunology* 169:4905-4912.
- Zeng, X. Y., J. A. Turkstra, R. H. Meloen, X. Y. Liu, F. Q. Chen, W. M. M. Schaaper, H. B. R. Oonk, D. Z. Guo, and D. F. M. van de Wiel
2002a "Active Immunization Against Gonadotropin-releasing Hormone in Chinese Male Pigs: Effects of Dose on Antibody Titer, Hormone Levels and Sexual Development." *Animal Reproduction Science* 70:223-233.
- Zeng, X. Y., J. A. Turkstra, A. Tsigos, R. H. Meloen, X. Y. Liu, F. Q. Chen, W. M. M. Schaaper, H. B. Oonk, D. Z. Guo, and D. F. M. van de Weil
2002b. "Effects of Active Immunization Against GnRH on Serum LH, Inhibin A, Sexual Development and Growth Rate in Chinese Female Pigs." *Theriogenology* 58:1315-132.
- Zimmerman, C.
2009 Personal communication between Carl Zimmerman, Chief of Natural Resources, Assateague Island National Seashore and Kristina Heister, Natural Resource Manager, Valley Forge NHP on 2/19/2009 regarding use of fertility control at Assateague Island National Seashore.

Appendix F: Comments and Responses on the Draft Plan/ Environmental Impact Statement

Pursuant to the National Environmental Policy Act (NEPA), its implementing regulations, and National Park Service (NPS) guidance on meeting NEPA requirements, Valley Forge National Historical Park (NHP) must assess and consider comments submitted on the Draft White-tailed Deer Management Plan/Environmental Impact Statement (plan/DEIS) and provide responses to substantive public comments. This report describes how the NPS considered public comments and provides responses to the substantive comments.

The Draft plan/EIS was released for a 60-day public and agency review period beginning December 19, 2008 and ending February 17, 2009. This public comment period was announced through the park's website (<www.nps.gov/vafo>), posted on park kiosks, through postcards that were sent to interested parties elected officials, and appropriate local and state agencies, and through press releases and newspapers. The plan/DEIS was made available through several outlets, including the NPS's Planning, Environment, and Public Comment (PEPC) web site (<<http://parkplanning.nps.gov>>), and on CD or hardcopy at the Valley Forge NHP Welcome Center, the Chester County Library, the Lower Providence Community Library, the Tredyffrin Public Library, the Upper Merion Township Public Library, the Phoenixville Public, and at the Montgomery County-Norristown Public Library. Copies of the plan/DEIS also were mailed to interested parties, elected officials, and appropriate local and state agencies. After reviewing the plan/DEIS, the public was encouraged to submit comments through the NPS's PEPC web site, emailing the park, or by postal mail sent directly to the park.

Public Comment Meetings

As noted above, the plan/EIS was available for public review and comment between December 19, 2008 and February 17, 2009. In addition, two public meetings were held to present the plan and solicit input in January 2009. Public meetings were held to present the plan, provide an opportunity to ask questions, and facilitate public involvement and community feedback on the plan/DEIS for deer management at Valley Forge NHP.

The two public meetings were held during the public comment period for the plan/DEIS. The first meeting was held on January 14, 2009 from 6:00 pm to 9:00 pm at the Tredyffrin Township Building in Chester County, Pennsylvania. The second meeting was held on January 15, 2009 from 1:00 pm to 4:00 pm at the Valley Forge NHP Education Center in Montgomery County. These public meetings were held to continue the public involvement and to obtain community feedback on the plan/DEIS for deer management at Valley Forge NHP. Release and availability of the draft plan, as well as public meetings, were advertised as described above.

A total of 83 meeting attendees signed in during the two meetings (see Appendix 1, Volume 2). The meetings began with a brief open house format where attendees had the opportunity to ask questions and observe displays illustrating the study area, the purpose, need, and objectives of the plan, and summaries of the four proposed

alternatives, as well as chronic wasting disease (CWD), deer population monitoring, vegetation monitoring and impacts. The open house format was followed by a formal presentation by park staff, explaining the specifics of the plan and the proposed alternatives. The presentation was followed by break out sessions that allowed the attendees to submit comments, and discuss issues with the project team in small groups.

For breakout sessions, attendees assembled at their assigned tables (table numbers were distributed randomly as attendees arrived and signed-in). Members of the project team served as table facilitators at each table, and were the note takers for each breakout group. Comments made by attendees during the break out sessions were recorded by the table note takers on large flip charts. If the commenter did not want to make comments at the break out sessions, comments sheets were available at the sign-in table and at each break out table. Attendees could fill out the forms and submit them at the meeting or mail them to the park at any time during the public comment period, which ended February 17, 2009. Those attending the meeting were also given a public meeting informational handout, which provided additional information about the NEPA process, commonly asked questions regarding CWD, a comparison of actions under each proposed alternative, and additional opportunities for comment on the project, including directing comments to the NPS's Planning, Environment, and Public Comment (PEPC) website at <http://parkplanning.nps.gov/>. Public comments received are detailed in the following sections of this report. Each comment recorded on flip charts at the meetings was counted as a separate comment.

Methodology

During the comment period, 1,168 pieces of correspondence were received. Correspondence was received by one of the following methods: email, hard copy letter via mail, comment sheet submitted at the public meetings, recorded on flipcharts during the public meetings, or entered directly into the Internet-based PEPC system. Letters received by email or through the postal mail, as well as the comments received from the public meetings, were entered into the PEPC system for analysis. Each of these letters or submissions is referred to as correspondence.

Once all the correspondence was entered into PEPC, each was read, and specific comments within each correspondence were identified. A total of 3,885 comments were derived from the correspondence received.

In order to categorize and address comments, each comment was given a code to identify the general content of a comment and to group similar comments together. A total of 105 codes were used to categorize all of the comments received on the plan/DEIS. An example of a code developed for this project is SRAL4000 Socioeconomic Resources and Adjacent Lands: Impact of Proposal and Alternatives. In some cases, the same comment may be categorized under more than one code, reflecting the fact that the comment may contain more than one issue or idea.

During coding, comments were also classified as substantive or non-substantive. A substantive comment is defined in the NPS Director's Order 12 (DO-12) Handbook as one that does one or more of the following (DO-12, Section 4.6A):

- Question, with a reasonable basis, the accuracy of information presented in the EIS;
- Question, with reasonable basis, the adequacy of the environmental analysis;
- Present reasonable alternatives other than those presented in the EIS; and/or
- Cause changes or revisions in the proposal.

As further stated in DO-12, substantive comments “raise, debate, or question a point of fact or policy. Comments in favor of or against the proposed action or alternatives, or comments that only agree or disagree with NPS policy, are not considered substantive.” While all comments were read and considered and will be used to help create the Final Plan/EIS, only those determined to be substantive were analyzed for creation of concern statements for response from the NPS, described below.

Under each code, all substantive comments were grouped by similar themes, and those groups were summarized with a concern statement. For example under the code AL7000 - Alternatives: Cost and Funding (General), one concern statement identified was, “Commenters questioned the cost analysis regarding implementing reproductive control measures, suggesting that the estimates are too high.” This one concern statement captured many comments. Following each concern statement are one or more “representative quotes” which are comments taken directly from the correspondence to illustrate the issue, concern, or idea expressed by the comments grouped under that concern statement.

Approximately 46% of the comments received related to 3 of the 162 codes. These codes were related to general lethal reduction, objectives in taking action, and the preferred combined lethal and nonlethal alternative, and were all non-substantive. The majority of the comments were categorized under code AL4185 – Alternatives: Lethal Reduction - General (Non-Substantive), which accounted for 20.70% of the total comments made. Comments in support of Alternative D: Combined Lethal and Nonlethal Actions were the second most common comment, representing 12.64% of the total comments made. Of the 1,168 correspondences, 889 (76%) came from commenters in the state of Pennsylvania, while the remaining correspondences came from 34 other states. The majority of correspondence (92%) came from unaffiliated individuals, with 7% of the correspondence coming from conservation/preservation organizations.

Guide to this Document

This report is organized as follows:

Content Analysis Report: This is the basic report produced from PEPC that provides information on the numbers and types of comments received, organized by code and by various demographics. The first section is a summary of the number of comments that fall under each code or topic, and what percentage of comments fall under each code. Note that those coded “XX1000 – Duplicate Comment” represent comments that were entered into the system twice and are not additional comments on the document.

Data are then presented on the amount of correspondence by type (i.e., amount of comments through PEPC, emails, letters, etc.); and amount received by organization

type (i.e., organizations, governments, individuals, etc.), and amount received by state and country.

Concern Response Report: This report summarizes the substantive comments received during the draft EIS public review comment process. These comments are organized by codes and further organized into concern statements. Representative quotes are then provided for each concern statement. An agency response is provided for each concern statement.

Additional information, including the meeting sign-in, correspondence list, index by organization type report, index by code report, and non-substantive issues report can be found in the full version of the Public Comment Analysis Report for the Draft White-tailed Deer Management Plan/Environmental Impact Statement available on the PEPC website.

Content Analysis Report

As mentioned above, this is the basic report produced from PEPC that provides information on the numbers and types of comments received, organized by code and by various demographics. Table F-1 provides a summary of the number of comments that fall under each code or topic, and what percentage of comments fall under each code. It also indicates where each substantive code is addressed in the concern response report. Note that those coded “XX1000 – Duplicate Comment” represent comments that were entered into the system twice and are not additional comments on the document. This table lists the substantive and nonsubstantive comments received on the Draft plan/EIS; however, only the substantive comments are included in the response portion of this document. The codes are presented alphabetically in this table.

Data are then presented on the amount of correspondence by type (i.e., amount of comments through PEPC, emails, letters, etc.) (Table F-2), amount received by organization type (i.e., organizations, governments, individuals, etc.) (Table F-3), and amount received by state (Table F-4) and country (Table F-5).

Table F-6 provides a listing of all groups that submitted comments, arranged and grouped by organization type. Under each organization type, the commenters are listed alphabetically, along with their correspondence number and the codes that their comments were assigned. Correspondence submitted by unaffiliated individuals is not represented in this table.

Table F-1 Content Analysis Report				
Code	Description	# of Comments	% of Comments	Page #
AE10010	Affected Environment: Vegetation and Special Status Plant Species	8	0.21%	F-61
AE10015	Affected Environment: Vegetation and Special Status Plant Species (Non-Substantive)	39	1.00%	n/a
AE13500	Affected Environment: Cultural Landscapes	3	0.08%	F-64
AE13505	Affected Environment: Cultural Landscapes (Non-Substantive)	4	0.10%	n/a
AE14005	Affected Environment: Historic Structures (Non-Substantive)	1	0.03%	n/a
AE22505	Affected Environment: Visitor Use and Experience (Non-Substantive)	48	1.24%	n/a
AE24000	Affected Environment: White-tailed Deer Population	10	0.26%	F-64
AE24005	Affected Environment: White-tailed Deer Population (Non-Substantive)	75	1.93%	n/a
AE26005	Affected Environment: Socioeconomic Resources and Adjacent Land (Non-Substantive)	33	0.85%	n/a
AE28000	Affected Environment: Park Operations	1	0.03%	F-68
AE28005	Affected Environment: Park Operations (Non-Substantive)	3	0.08%	n/a
AE29005	Affected Environment: Public Safety (Non-Substantive)	72	1.85%	n/a
AE31005	Affected Environment: Other Wildlife, Wildlife Habitat, and Special Status Animal Species (Non-Substantive)	22	0.57%	n/a

Table F-1 Content Analysis Report (continued)

Code	Description	# of Comments	% of Comments	Page #
AL1500	Alternatives: Elements Common to All Alternatives (Non-Substantive)	8	0.21%	n/a
AL2045	Alternatives: Alternative Eliminated - Reintroduction of Predators (Non-Substantive)	31	0.80%	n/a
AL2070	Alternatives: Alternative Eliminated - Capture and Relocation	1	0.03%	F-32
AL2075	Alternatives: Alternative Eliminated - Capture and Relocation (Non-Substantive)	55	1.42%	n/a
AL2100	Alternatives: Use of Volunteers	1	0.03%	F-33
AL2105	Alternatives: Alternative Eliminated - Public Hunting (Non-Substantive)	101	2.60%	n/a
AL2160	Alternatives: Alternative Eliminated - Surgical Reproductive Control	3	0.08%	F-33
AL2165	Alternatives: Alternative Eliminated - Surgical Reproductive Control (Non-Substantive)	14	0.36%	n/a
AL2195	Alternatives: Alternative Eliminated - Fencing Entire Park (Non-Substantive)	9	0.23%	n/a
AL2205	Alternatives: Alternatives Eliminated - Repellents, Plantings, and other Deterrents (Non-Substantive)	13	0.33%	n/a
AL2215	Alternatives: Alternative Eliminated - Poisons (Non-Substantive)	1	0.03%	n/a
AL2220	Alternatives: Alternative Eliminated - Supplemental Feeding	2	0.05%	F-35
AL2225	Alternatives: Alternative Eliminated - Supplemental Feeding (Non-Substantive)	13	0.33%	n/a
AL2235	Alternatives: Alternative Eliminated - Use the Deer Population as a Research Model (Non-Substantive)	4	0.10%	n/a
AL3000	Alternatives: Envir. Preferred Alt./NEPA § .101&102	2	0.05%	F-35
AL4000	Alternatives: New Alternatives Or Elements	75	1.93%	F-36
AL4040	Alternatives: Sharpshooting	8	0.21%	F-43
AL4045	Alternatives: Sharpshooting (Non-Substantive)	111	2.86%	n/a
AL4105	Alternatives: Non-Lethal Methods (General) (Non-Substantive)	96	2.47%	n/a
AL4180	Alternatives: Lethal Reduction - General	95	2.45%	F-45
AL4185	Alternatives: Lethal Reduction - General (Non-Substantive)	804	20.69%	n/a
AL4360	Alternatives: Reproductive Control of Does	42	600.00%	F-50
AL4370	Alternatives: Reproductive Control of Does (Non-Substantive)	148	2114.29%	n/a
AL4380	Alternatives: Rotational Fencing	4	57.14%	F-56
AL4390	Alternatives: Rotational Fencing (Non-Substantive)	17	242.86%	n/a
AL4410	Alternatives: Capture and Euthanasia (Non-Substantive)	1	0.03%	n/a
AL5220	Support Alternative A - No Action (Non-Substantive)	236	6.07%	n/a
AL5230	Oppose Alternative A - No Action (Non-Substantive)	66	1.70%	n/a

Table F-1 Content Analysis Report (continued)

Code	Description	# of Comments	% of Comments	Page #
AL5400	Support Alternative B - Combined Nonlethal Actions (Non-Substantive)	36	0.93%	n/a
AL5500	Oppose Alternative B - Combined Nonlethal Actions (Non-Substantive)	17	0.44%	n/a
AL5600	Alternatives: Alternative C - Combined Lethal Actions	3	0.08%	F-57
AL5700	Support Alternative C - Combined Lethal Actions (Non-Substantive)	32	0.82%	n/a
AL5800	Oppose Alternative C - Combined Lethal Actions (Non-Substantive)	27	0.69%	n/a
AL6000	Support Alternative D - Combined Lethal and Nonlethal Actions (Non-Substantive)	491	12.64%	n/a
AL6100	Oppose Alternative D - Combined Lethal Actions and Reproductive Control (Non-Substantive)	43	1.11%	n/a
AL7000	Alternatives: Cost and Funding (General)	4	0.10%	F-59
AL7500	Alternatives: Cost and Funding (General) (Non-Substantive)	11	0.28%	n/a
AR4000	Archeological Resources: Impact of Proposal and Alternatives	1	0.03%	F-68
CC1000	Consultation and Coordination: General Comments	27	0.69%	F-94
CC2000	Consultation and Coordination: General Comments (Non-Substantive)	7	0.18%	n/a
CWD1000	Chronic Wasting Disease Response Plan	9	0.23%	F-82
CWD2000	Chronic Wasting Disease Response Plan (Non-Substantive)	8	0.21%	n/a
ED1000	Editorial (Non-Substantive)	4	0.10%	n/a
GA1000	Impact Analysis: Impact Analyses	9	0.23%	F-85
GA2001	Impact Analysis: Use Trends And Assumptions (Non-Substantive)	2	0.05%	n/a
GA3000	Impact Analysis: General Methodology For Establishing Impacts/Effects	25	0.64%	F-88
GA3500	Impact Analysis: General Methodology For Establishing Impacts/Effects (Non-Substantive)	16	0.41%	n/a
HS2000	Historic Structures: Methodology and Assumptions	1	0.03%	F-69
MT1001	Miscellaneous Topics: General Comments (Non-Substantive)	268	6.90%	n/a
ON1000	Other NEPA Issues: General Comments	11	0.28%	F-92
PN1000	Purpose And Need: Planning Process And Policy	17	0.44%	F-17
PN11500	Purpose And Need: Other Policies And Mandates (Non-Substantive)	2	0.05%	n/a
PN2000	Purpose And Need: Park Purpose And Significance	6	0.15%	F-19
PN2500	Purpose And Need: Park Purpose And Significance (Non-Substantive)	3	0.08%	n/a
PN3000	Purpose And Need: Scope Of The Analysis	24	0.62%	F-21
PN3500	Purpose and Need: Scope of the Analysis (Non-Substantive)	8	0.21%	n/a

Table F-1 Content Analysis Report (continued)				
Code	Description	# of Comments	% of Comments	Page #
PN4000	Purpose And Need: Park Legislation/Authority	18	0.46%	F-26
PN8000	Purpose And Need: Objectives In Taking Action	11	0.28%	F-30
PN8500	Purpose and Need: Objectives in Taking Action (Non-Substantive)	482	12.41%	n/a
PO4000	Park Operations: Impact Of Proposal And Alternatives	4	0.10%	F-70
PO4500	Park Operations: Impact Of Proposal And Alternatives (Non-Substantive)	1	0.03%	n/a
PS2000	Public Safety: Methodology and Assumptions	7	0.18%	F-71
PS2500	Public Safety: Methodology and Assumptions (Non-Substantive)	2	0.05%	n/a
PS4000	Public Safety: Impact of Proposal and Alternatives	3	0.08%	F-74
SRAL2000	Socioeconomic Resources and Adjacent Lands: Methodology and Assumptions	5	0.13%	F-74
VSSP1000	Vegetation and Special Status Plant Species: Guiding Policies, Regs, and Laws	2	0.05%	F-76
VSSP2000	Vegetation and Special Status Plant Species: Methodology and Assumptions	5	0.13%	F-77
VSSP4005	Vegetation and Special Status Plant Species: Impact of Proposal and Alternatives (Non-Substantive)	1	0.03%	n/a
VUE4000	Visitor Use and Experience: Impact of Proposal and Alternatives	17	0.44%	F-78
WDLF4005	Other Wildlife, Wildlife Habitat, and Special Status Animal Species: Impact of Proposal and Alternatives (Non-Substantive)	3	0.08%	n/a
WTD2000	White-tailed Deer Population: Methodology and Assumptions	5	0.13%	F-80
WTD4000	White-tailed Deer Population: Impact of Proposal and Alternatives	36	0.93%	F-81
WTD6000	White-tailed Deer Population: Impairment Analysis	3	0.08%	F-81
XX1000	Duplicate Comment	7	0.18%	n/a
XX2000	Duplicate Correspondence	7	0.18%	n/a
Total		3885		

Table F-2 Correspondence Distribution by Correspondence Type

Type	# of Correspondences
Other	12
Web Form	975
Park Form	9
Letter	50
Fax	1
E-mail	121
Total	1168

Table F-3 Correspondence Signature Count by Organization Type

Organization Type	# of Correspondences
Town or City Government	2
County Government	1
Federal Government	1
University/Professional Society	1
Conservation/Preservation	82
Recreational Groups	7
State Government	1
Unaffiliated Individual	1069
Civic Groups	3
Churches, Religious Groups	1
Total	1168

Table F-4 Correspondence Distribution by State

State	Percentage	# of Correspondences
NJ	2.40%	28
MN	0.08%	1
UN	0.51%	6
AK	0.17%	2
CA	1.11%	13
AL	0.26%	3
ND	0.08%	1
MA	0.86%	10
VA	0.60%	7
WI	0.26%	3
MD	0.34%	4
OH	0.34%	4
TN	0.08%	1
UT	0.08%	1
IL	0.51%	6
MI	0.08%	1
ME	0.08%	1
GA	0.08%	1
KS	0.08%	1
NY	2.48%	29
DE	0.34%	4
DC	0.26%	3
SC	0.17%	2
MT	0.08%	1
IA	0.17%	2
CO	0.08%	1
WA	0.34%	4
FL	0.60%	7
NV	0.34%	4
CT	1.11%	13
TX	0.68%	8
IN	0.08%	1
PA	76.11%	889
OR	0.17%	2
NC	0.51%	6
KY	0.17%	2
Total	100%	1168

Table F-5 Correspondence Distribution by Country

Country	Percent	# of Correspondences
N/A	7%	84
United States of America	92%	1072
Spain	less than 1%	1
Hungary	less than 1%	1
Canada	1%	9
Albania	less than 1%	1
Total	100%	1168

Table F-6 Index of Coding by Organization**Churches, Religious Groups**

First United Methodist Church of Germantown - 664; AL4105 - Alternatives: Non-Lethal Methods (General) (Non-Substantive). AL4185 - Alternatives: Lethal Reduction - General (Non-Substantive). AL4370 - Alternatives: Reproductive Control of Does (Non-Substantive).

Civic Groups

LIDA - 925; AL2045 - Alternatives: Alternative Eliminated - Reintroduction of Predators (Non-Substantive). AL4000 - Alternatives: New Alternatives Or Elements. AL4045 - Alternatives: Sharpshooting (Non-Substantive). AL4185 - Alternatives: Lethal Reduction - General (Non-Substantive). AL5220 - Support Alternative A - No Action (Non-Substantive).

The Friends of Valley Forge Park - 1021; AE10015 - Affected Environment: Vegetation and Special Status Plant Species (Non-Substantive). AE24005 - Affected Environment: White-tailed Deer Population (Non-Substantive). AE31005 - Affected Environment: Other Wildlife, Wildlife Habitat, and Special Status Animal Species (Non-Substantive). AL5230 - Oppose Alternative A - No Action (Non-Substantive). MT1001 - Miscellaneous Topics: General Comments (Non-Substantive).

VFW Post 8779 - 800; AL5500 - Oppose Alternative B - Combined Nonlethal Actions (Non-Substantive). MT1001 - Miscellaneous Topics: General Comments (Non-Substantive).

Conservation/Preservation

"Humanity" - 633; AE22505 - Affected Environment: Visitor Use and Experience (Non-Substantive). AL4105 - Alternatives: Non-Lethal Methods (General) (Non-Substantive). AL4185 - Alternatives: Lethal Reduction - General (Non-Substantive). AL5800 - Oppose Alternative C - Combined Lethal Actions (Non-Substantive).

American Sanctuary Association - 921; AL5220 - Support Alternative A - No Action (Non-Substantive).

Animal Rights Asheville - 962; AL5220 - Support Alternative A - No Action (Non-Substantive).

Animal Welfare Institute - 1019; MT1001 - Miscellaneous Topics: General Comments (Non-Substantive). 1108; AE10010 - Affected Environment: Vegetation and Special Status Plant Species. AE13500 - Affected Environment: Cultural Landscapes. AE22505 - Affected Environment: Visitor Use and Experience (Non-Substantive). AE24000 - Affected Environment: White-tailed Deer Population. AE28000 - Affected Environment: Park Operations. AE31005 - Affected Environment: Other Wildlife, Wildlife Habitat, and Special Status Animal Species (Non-Substantive). AL2205 - Alternatives: Alternatives Eliminated - Repellents, Plantings, and other Deterrents (Non-Substantive). AL2235 - Alternatives: Alternative Eliminated - Use the Deer Population as a Research Model (Non-Substantive). AL3000 - Alternatives: Envir. Preferred Alt./NEPA § .101&102. AL4000 - Alternatives: New Alternatives Or Elements. AL4105 - Alternatives: Non-Lethal Methods (General) (Non-Substantive). AL4185 - Alternatives: Lethal Reduction - General (Non-Substantive). AL4360 - Alternatives: Reproductive Control of Does. AL4370 - Alternatives: Reproductive Control of Does (Non-Substantive). AL4390 - Alternatives: Rotational Fencing (Non-Substantive). AL5400 - Support Alternative B - Combined Nonlethal Actions (Non-Substantive). AL5500 - Oppose Alternative B - Combined Nonlethal Actions (Non-Substantive). AL5600 - Alternatives: Alternative C - Combined Lethal Actions. AL5800 - Oppose Alternative C - Combined Lethal Actions (Non-Substantive). AL6100 - Oppose Alternative D - Combined Lethal Actions and Reproductive Control (Non-Substantive). AL7000 - Alternatives: Cost and Funding (General). AR4000 - Archeological Resources: Impact of Proposal and Alternatives. CC1000 - Consultation and Coordination: General Comments. CWD1000 - Chronic Wasting Disease Response Plan. GA1000 - Impact Analysis: Impact Analyses. GA3000 - Impact Analysis: General Methodology For Establishing Impacts/Effects. HS2000 - Historic Structures: Methodology and Assumptions. ON1000 - Other NEPA Issues: General Comments. PN1000 - Purpose And Need: Planning Process And Policy. PN2000 - Purpose And Need: Park Purpose And Significance. PN3000 - Purpose And Need: Scope Of The Analysis. PN3500 - Purpose And Need: Scope of the Analysis (Non-Substantive). PN4000 - Purpose And Need: Park Legislation/Authority. PN8000 - Purpose And Need: Objectives In Taking Action. PO4000 - Park Operations: Impact Of Proposal And Alternatives. PS2000 - Public Safety: Methodology and Assumptions. SRAL2000 - Socioeconomic Resources and Adjacent Lands: Methodology and Assumptions. VSSP1000 - Vegetation and Special Status Plant Species: Guiding Policies, Regs, and Laws. VSSP2000 - Vegetation and Special Status Plant Species: Methodology and Assumptions. VUE4000 - Visitor Use and Experience: Impact of Proposal and Alternatives. WTD2000 - White-tailed Deer Population: Methodology and Assumptions. WTD4000 - White-tailed Deer Population: Impact of Proposal and Alternatives. WTD6000 - White-tailed Deer Population: Impairment Analysis.

Table F-6 Index of Coding by Organization (continued)**Conservation/Preservation (continued)**

The ARK - 866; AL2075 - Alternatives: Alternative Eliminated - Capture and Relocation (Non-Substantive). AL2165 - Alternatives: Alternative Eliminated - Surgical Reproductive Control (Non-Substantive).

Audubon Pennsylvania - 872; AE24005 - Affected Environment: White-tailed Deer Population (Non-Substantive). AL6000 - Support Alternative D - Combined Lethal and Nonlethal Actions (Non-Substantive). MT1001 - Miscellaneous Topics: General Comments (Non-Substantive). PN8000 - Purpose And Need: Objectives In Taking Action. PN8500 - Purpose and Need: Objectives in Taking Action (Non-Substantive).

Clean Water Action - 629; AL2105 - Alternatives: Alternative Eliminated - Public Hunting (Non-Substantive).

Coalition to Protect Animals in Parks & Refuges - 401; AL4180 - Alternatives: Lethal Reduction - General. AL4390 - Alternatives: Rotational Fencing (Non-Substantive).

FOA - 706; AL5220 - Support Alternative A - No Action (Non-Substantive). 709; MT1001 - Miscellaneous Topics: General Comments (Non-Substantive). 735; AL5220 - Support Alternative A - No Action (Non-Substantive). 742; AL5220 - Support Alternative A - No Action (Non-Substantive). 913; AL5220 - Support Alternative A - No Action (Non-Substantive).

Friends of Animals - 743; AL5220 - Support Alternative A - No Action (Non-Substantive). 783; AL5220 - Support Alternative A - No Action (Non-Substantive).

Friends of Animals - 62; AE22505 - Affected Environment: Visitor Use and Experience (Non-Substantive). AE24005 - Affected Environment: White-tailed Deer Population (Non-Substantive). AL2045 - Alternatives: Alternative Eliminated - Reintroduction of Predators (Non-Substantive). AL5220 - Support Alternative A - No Action (Non-Substantive). MT1001 - Miscellaneous Topics: General Comments (Non-Substantive). PN2500 - Purpose And Need: Park Purpose And Significance (Non-Substantive). PN8000 - Purpose And Need: Objectives In Taking Action. 694; AL5220 - Support Alternative A - No Action (Non-Substantive). 696; AL5220 - Support Alternative A - No Action (Non-Substantive). 697; AL5220 - Support Alternative A - No Action (Non-Substantive). 699; AL4390 - Alternatives: Rotational Fencing (Non-Substantive). AL5220 - Support Alternative A - No Action (Non-Substantive). CC1000 - Consultation and Coordination: General Comments. CWD2000 - Chronic Wasting Disease Response Plan (Non-Substantive). 700; AL5220 - Support Alternative A - No Action (Non-Substantive). 702; AL5220 - Support Alternative A - No Action (Non-Substantive). 704; AL5220 - Support Alternative A - No Action (Non-Substantive). 723; AL5220 - Support Alternative A - No Action (Non-Substantive). 727; AE10015 - Affected Environment: Vegetation and Special Status Plant Species (Non-Substantive). AL5220 - Support Alternative A - No Action (Non-Substantive). 747; AL4105 - Alternatives: Non-Lethal Methods (General) (Non-Substantive). AL4185 - Alternatives: Lethal Reduction - General (Non-Substantive). 748; AL5220 - Support Alternative A - No Action (Non-Substantive). 761; AL4390 - Alternatives: Rotational Fencing (Non-Substantive). AL5220 - Support Alternative A - No Action (Non-Substantive). 764; AL5220 - Support Alternative A - No Action (Non-Substantive). 765; AL5220 - Support Alternative A - No Action (Non-Substantive). PN8500 - Purpose and Need: Objectives in Taking Action (Non-Substantive). 769; AL5220 - Support Alternative A - No Action (Non-Substantive). 773; AL5220 - Support Alternative A - No Action (Non-Substantive). 778; AL5220 - Support Alternative A - No Action (Non-Substantive). 782; AL5220 - Support Alternative A - No Action (Non-Substantive). 791; AE10015 - Affected Environment: Vegetation and Special Status Plant Species (Non-Substantive). AL5220 - Support Alternative A - No Action (Non-Substantive). 796; AL5220 - Support Alternative A - No Action (Non-Substantive). 814; AL5220 - Support Alternative A - No Action (Non-Substantive). 830; AE24005 - Affected Environment: White-tailed Deer Population (Non-Substantive). 840; AL5220 - Support Alternative A - No Action (Non-Substantive).

Friends of Animals, Inc. - 506; AE10015 - Affected Environment: Vegetation and Special Status Plant Species (Non-Substantive). AE29005 - Affected Environment: Public Safety (Non-Substantive). AL2045 - Alternatives: Alternative Eliminated - Reintroduction of Predators (Non-Substantive). AL2075 - Alternatives: Alternative Eliminated - Capture and Relocation (Non-Substantive). AL2205 - Alternatives: Alternatives Eliminated - Repellents, Plantings, and other Deterrents (Non-Substantive). AL4000 - Alternatives: New Alternatives Or Elements. AL4045 - Alternatives: Sharpshooting (Non-Substantive). AL4105 - Alternatives: Non-Lethal Methods (General) (Non-Substantive). AL4180 - Alternatives: Lethal Reduction - General. AL4185 - Alternatives: Lethal Reduction - General (Non-Substantive). AL4360 - Alternatives: Reproductive Control of Does. AL4370 - Alternatives: Reproductive Control of Does (Non-Substantive). AL5220 - Support Alternative A - No Action (Non-Substantive). AL5500 - Oppose Alternative B - Combined Nonlethal Actions (Non-Substantive). AL5800 - Oppose Alternative C - Combined Lethal Actions (Non-Substantive). AL6000 - Support Alternative D - Combined Lethal and Nonlethal Actions (Non-Substantive). AL6100 - Oppose Alternative D - Combined Lethal Actions and Reproductive Control (Non-Substantive). CC1000 - Consultation and Coordination: General Comments. GA3000 - Impact Analysis: General Methodology For Establishing Impacts/Effects. GA3500 - Impact Analysis: General Methodology For Establishing Impacts/Effects (Non-Substantive). MT1001 - Miscellaneous Topics: General Comments (Non-Substantive). PN1000 - Purpose And Need: Planning Process And Policy. PN8500 - Purpose and Need: Objectives in Taking Action (Non-Substantive). WTD4000 - White-tailed Deer Population: Impact of Proposal and Alternatives.

Table F-6 Index of Coding by Organization (continued)**Conservation/Preservation (continued)**

Friends of Fox Chase Farm - 777; AL4045 - Alternatives: Sharpshooting (Non-Substantive).

Friends of Valley Forge Park - 54; AE10015 - Affected Environment: Vegetation and Special Status Plant Species (Non-Substantive). AE13505 - Affected Environment: Cultural Landscapes (Non-Substantive). AE24005 - Affected Environment: White-tailed Deer Population (Non-Substantive). AE26005 - Affected Environment: Socioeconomic Resources and Adjacent Land (Non-Substantive). AE29005 - Affected Environment: Public Safety (Non-Substantive). AL4045 - Alternatives: Sharpshooting (Non-Substantive). AL4370 - Alternatives: Reproductive Control of Does (Non-Substantive). AL6000 - Support Alternative D - Combined Lethal and Nonlethal Actions (Non-Substantive). MT1001 - Miscellaneous Topics: General Comments (Non-Substantive). PN8500 - Purpose and Need: Objectives in Taking Action (Non-Substantive).

Friends of Valley Forge/NPCA - 27; AL4045 - Alternatives: Sharpshooting (Non-Substantive). AL4370 - Alternatives: Reproductive Control of Does (Non-Substantive).

Friends of the Wissahickon - 768; MT1001 - Miscellaneous Topics: General Comments (Non-Substantive).

GeesePeace - 953; AE26005 - Affected Environment: Socioeconomic Resources and Adjacent Land (Non-Substantive). AL2225 - Alternatives: Alternative Eliminated - Supplemental Feeding (Non-Substantive). AL4000 - Alternatives: New Alternatives Or Elements. AL4370 - Alternatives: Reproductive Control of Does (Non-Substantive). AL5220 - Support Alternative A - No Action (Non-Substantive). AL5800 - Oppose Alternative C - Combined Lethal Actions (Non-Substantive). AL6100 - Oppose Alternative D - Combined Lethal Actions and Reproductive Control (Non-Substantive). MT1001 - Miscellaneous Topics: General Comments (Non-Substantive). PN3000 - Purpose And Need: Scope Of The Analysis. PS2000 - Public Safety: Methodology and Assumptions.

HUMANE Essex County - 555; AE31005 - Affected Environment: Other Wildlife, Wildlife Habitat, and Special Status Animal Species (Non-Substantive). AL5220 - Support Alternative A - No Action (Non-Substantive). MT1001 - Miscellaneous Topics: General Comments (Non-Substantive). PN8500 - Purpose and Need: Objectives in Taking Action (Non-Substantive).

The Humane Society of the United States - 978; AE10010 - Affected Environment: Vegetation and Special Status Plant Species. AE24005 - Affected Environment: White-tailed Deer Population (Non-Substantive). AE26005 - Affected Environment: Socioeconomic Resources and Adjacent Land (Non-Substantive). AE28005 - Affected Environment: Park Operations (Non-Substantive). AL2160 - Alternatives: Alternative Eliminated - Surgical Reproductive Control. AL2165 - Alternatives: Alternative Eliminated - Surgical Reproductive Control (Non-Substantive). AL4040 - Alternatives: Sharpshooting. AL4045 - Alternatives: Sharpshooting (Non-Substantive). AL4180 - Alternatives: Lethal Reduction - General. AL4185 - Alternatives: Lethal Reduction - General (Non-Substantive). AL4360 - Alternatives: Reproductive Control of Does. AL4370 - Alternatives: Reproductive Control of Does (Non-Substantive). AL5400 - Support Alternative B - Combined Nonlethal Actions (Non-Substantive). MT1001 - Miscellaneous Topics: General Comments (Non-Substantive). PN3000 - Purpose And Need: Scope Of The Analysis. PN4000 - Purpose And Need: Park Legislation/Authority. PN8000 - Purpose And Need: Objectives In Taking Action. VUE4000 - Visitor Use and Experience: Impact of Proposal and Alternatives. WTD2000 - White-tailed Deer Population: Methodology and Assumptions.

Humane Society of the United States - 885; AL5230 - Oppose Alternative A - No Action (Non-Substantive). AL5400 - Support Alternative B - Combined Nonlethal Actions (Non-Substantive).

Marion Co. Humane Society - 705; AL5220 - Support Alternative A - No Action (Non-Substantive).

Mill Grove Audubon Bird Sanctuary - 720; VUE4000 - Visitor Use and Experience: Impact of Proposal and Alternatives.

Mobilization for Animals - PA, Inc. - 998; AL4180 - Alternatives: Lethal Reduction - General. 1004; AE26005 - Affected Environment: Socioeconomic Resources and Adjacent Land (Non-Substantive). AL4185 - Alternatives: Lethal Reduction - General (Non-Substantive). AL7500 - Alternatives: Cost and Funding (General) (Non-Substantive). MT1001 - Miscellaneous Topics: General Comments (Non-Substantive). PN8500 - Purpose and Need: Objectives in Taking Action (Non-Substantive).

NPCA - 30; AL4185 - Alternatives: Lethal Reduction - General (Non-Substantive). AL5400 - Support Alternative B - Combined Nonlethal Actions (Non-Substantive).

Table F-6 Index of Coding by Organization (continued)**Conservation/Preservation (continued)**

National Parks Conservation Association - 1100; AE10015 - Affected Environment: Vegetation and Special Status Plant Species (Non-Substantive). AE31005 - Affected Environment: Other Wildlife, Wildlife Habitat, and Special Status Animal Species (Non-Substantive). AL2105 - Alternatives: Alternative Eliminated - Public Hunting (Non-Substantive). AL4185 - Alternatives: Lethal Reduction - General (Non-Substantive). AL4390 - Alternatives: Rotational Fencing (Non-Substantive). AL5230 - Oppose Alternative A - No Action (Non-Substantive). AL6000 - Support Alternative D - Combined Lethal and Nonlethal Actions (Non-Substantive). MT1001 - Miscellaneous Topics: General Comments (Non-Substantive). PN3000 - Purpose And Need: Scope Of The Analysis. PN8500 - Purpose and Need: Objectives in Taking Action (Non-Substantive).
PAFOA - 858; AL2105 - Alternatives: Alternative Eliminated - Public Hunting (Non-Substantive). AL4045 - Alternatives: Sharpshooting (Non-Substantive).
PETA - 516; AL4185 - Alternatives: Lethal Reduction - General (Non-Substantive). 1076; AL4180 - Alternatives: Lethal Reduction - General. AL4185 - Alternatives: Lethal Reduction - General (Non-Substantive). WTD4000 - White-tailed Deer Population: Impact of Proposal and Alternatives.
Pennsylvania Deer Association - 659; AE31005 - Affected Environment: Other Wildlife, Wildlife Habitat, and Special Status Animal Species (Non-Substantive). AL2105 - Alternatives: Alternative Eliminated - Public Hunting (Non-Substantive). AL4045 - Alternatives: Sharpshooting (Non-Substantive). AL4185 - Alternatives: Lethal Reduction - General (Non-Substantive).
People for the Ethical Treatment of Animals - 58; AL4180 - Alternatives: Lethal Reduction - General. AL4185 - Alternatives: Lethal Reduction - General (Non-Substantive).
Pike County Federation of Sportsmens Clubs - 658; AL4045 - Alternatives: Sharpshooting (Non-Substantive). AL5700 - Support Alternative C - Combined Lethal Actions (Non-Substantive).
Quality Deer Management Association - 959; AL2105 - Alternatives: Alternative Eliminated - Public Hunting (Non-Substantive). AL4045 - Alternatives: Sharpshooting (Non-Substantive). AL4390 - Alternatives: Rotational Fencing (Non-Substantive). AL5230 - Oppose Alternative A - No Action (Non-Substantive). AL5500 - Oppose Alternative B - Combined Nonlethal Actions (Non-Substantive). AL5800 - Oppose Alternative C - Combined Lethal Actions (Non-Substantive). PN8500 - Purpose and Need: Objectives in Taking Action (Non-Substantive). XX1000 - Duplicate Comment.
Safari Club International - 972; AL2100 - Alternatives: Use of Volunteers. AL2105 - Alternatives: Alternative Eliminated - Public Hunting (Non-Substantive). AL4045 - Alternatives: Sharpshooting (Non-Substantive). AL4105 - Alternatives: Non-Lethal Methods (General) (Non-Substantive). CC2000 - Consultation and Coordination: General Comments (Non-Substantive). MT1001 - Miscellaneous Topics: General Comments (Non-Substantive).
The Science and Conservation Center - 1130; AL4185 - Alternatives: Lethal Reduction - General (Non-Substantive). AL4360 - Alternatives: Reproductive Control of Does. AL4370 - Alternatives: Reproductive Control of Does (Non-Substantive). ED1000 - Editorial. GA3000 - Impact Analysis: General Methodology For Establishing Impacts/Effects. MT1001 - Miscellaneous Topics: General Comments (Non-Substantive). PS4000 - Public Safety: Impact of Proposal and Alternatives.
Sierra Club - Southeastern Group - 482; AL6100 - Oppose Alternative D - Combined Lethal Actions and Reproductive Control (Non-Substantive).
Sierra Club Southeast Pennsylvania Group - 33; AL4185 - Alternatives: Lethal Reduction - General (Non-Substantive). AL6000 - Support Alternative D - Combined Lethal and Nonlethal Actions (Non-Substantive). WDLF4005 - Other Wildlife, Wildlife Habitat, and Special Status Animal Species: Impact of Proposal and Alternatives (Non-Substantive).
spca sarasota - 969; AL5220 - Support Alternative A - No Action (Non-Substantive).
Valley Forge Citizens for Deer Control - 1018; AE13500 - Affected Environment: Cultural Landscapes. AL6000 - Support Alternative D - Combined Lethal and Nonlethal Actions (Non-Substantive). AL7500 - Alternatives: Cost and Funding (General) (Non-Substantive). GA3000 - Impact Analysis: General Methodology For Establishing Impacts/Effects. PN8000 - Purpose And Need: Objectives In Taking Action. PN8500 - Purpose and Need: Objectives in Taking Action (Non-Substantive).

Table F-6 Index of Coding by Organization (continued)

County Government
Chester County Planning Commission - 49; AL6000 - Support Alternative D - Combined Lethal and Nonlethal Actions (Non-Substantive). CC2000 - Consultation and Coordination: General Comments (Non-Substantive). MT1001 - Miscellaneous Topics: General Comments (Non-Substantive). PN11500 - Purpose And Need: Other Policies And Mandates (Non-Substantive).
Federal Government
Environmental Protection Agency - 939; AL6000 - Support Alternative D - Combined Lethal and Nonlethal Actions (Non-Substantive). MT1001 - Miscellaneous Topics: General Comments (Non-Substantive).
Recreational Groups
Community Garden Club at Wayne - 758; AL4185 - Alternatives: Lethal Reduction - General (Non-Substantive).
dolphin fleet whale watch - 586; AL4045 - Alternatives: Sharpshooting (Non-Substantive). AL5220 - Support Alternative A - No Action (Non-Substantive).
PHC Archery - 684; AL2105 - Alternatives: Alternative Eliminated - Public Hunting (Non-Substantive). AL4370 - Alternatives: Reproductive Control of Does (Non-Substantive).
Public Eye: Artists for Animals - 790; AE24005 - Affected Environment: White-tailed Deer Population (Non-Substantive). AL2165 - Alternatives: Alternative Eliminated - Surgical Reproductive Control (Non-Substantive). AL4045 - Alternatives: Sharpshooting (Non-Substantive). AL4105 - Alternatives: Non-Lethal Methods (General) (Non-Substantive).
UBP - 805; AL2105 - Alternatives: Alternative Eliminated - Public Hunting (Non-Substantive). AL4045 - Alternatives: Sharpshooting (Non-Substantive).
United Bowhunters of PA - 849; AL2105 - Alternatives: Alternative Eliminated - Public Hunting (Non-Substantive).
Wild Turkey Hunt Club - 784; AL2105 - Alternatives: Alternative Eliminated - Public Hunting (Non-Substantive). AL4045 - Alternatives: Sharpshooting (Non-Substantive).
State Government
Pennsylvania Game Commission - 1109; AL5230 - Oppose Alternative A - No Action (Non-Substantive). AL5500 - Oppose Alternative B - Combined Nonlethal Actions (Non-Substantive). AL5600 - Alternatives: Alternative C - Combined Lethal Actions. CWD2000 - Chronic Wasting Disease Response Plan (Non-Substantive). ED1000 - Editorial. GA2001 - Impact Analysis: Use Trends And Assumptions (Non-Substantive). GA3500 - Impact Analysis: General Methodology For Establishing Impacts/Effects (Non-Substantive). PS2000 - Public Safety: Methodology and Assumptions.
Town or City Government
Lower Providence Township - 48; AL6000 - Support Alternative D - Combined Lethal and Nonlethal Actions (Non-Substantive). MT1001 - Miscellaneous Topics: General Comments (Non-Substantive).
Tredyffrin Township Board of Supervisors - 1028; AL6000 - Support Alternative D - Combined Lethal and Nonlethal Actions (Non-Substantive). PN8500 - Purpose and Need: Objectives in Taking Action (Non-Substantive).
University/Professional Society
Cummings School of Veterinary Medicine, Tufts University - 1131; AL4360 - Alternatives: Reproductive Control of Does. GA1000 - Impact Analysis: Impact Analyses. GA3000 - Impact Analysis: General Methodology For Establishing Impacts/Effects. GA3500 - Impact Analysis: General Methodology For Establishing Impacts/Effects (Non-Substantive). MT1001 - Miscellaneous Topics: General Comments (Non-Substantive). PN3000 - Purpose And Need: Scope Of The Analysis.

Concern Response Report

As described above, this report summarizes the substantive comments received during the Draft plan/EIS public review comment process. These comments are organized by codes and further organized into concern statements. Representative quotes are then provided for each concern statement. An agency response is provided for each concern statement. Codes are presented in the same order as the Draft plan/EIS.

Representative quotes provided below are taken directly from PEPC and represent the text provided by the commenter, exactly as it was entered. Grammar and font style have not been changed.

PN1000 - Purpose And Need: Planning Process And Policy

CONCERN ID: 19743

CONCERN STATEMENT: Commenters questioned the relationship of the plan/DEIS to other planning efforts. Specifically, they stated that the GMP included a future vegetation plan that should have been discussed and traffic calming measures that should have been included and discussed in the deer plan/DEIS. They also stated that deer management decisions were already made in the GMP process, making the plan/DEIS an irrelevant document.

REPRESENTATIVE QUOTE(S):

Corr. ID: 506 **Organization:** Friends of Animals, Inc.

Comment ID: 93325 **Organization Type:** Conservation/Preservation

Representative Quote: Planned expansion of the Penn Turnpike is a genuine threat to native vegetation with which deer are simply symbiotic -- yet that expansion is mentioned, but not critically questioned, in the Plan/EIS. Every time such construction occurs, there is less room for native plants. Where are the forward-thinking moves to work with state planners so that public transport can become more attractive to commuters and road-widening is avoided?

Corr. ID: 1108 **Organization:** Animal Welfare Institute

Comment ID: 93708 **Organization Type:** Conservation/Preservation

Representative Quote: The decision about deer management and the use of lethal deer control is not pending but, in fact, was made in September 2007. The NPS cannot argue otherwise. If the NPS selects Alternative A or B at the conclusion of this planning process, it would be violating an affirmative decision made in the GMP/EIS/RoD since, as the NPS itself concedes, Alternatives A and B cannot meet the objectives in the Draft EIS. Consequently, the selection of Alternative A and B would not comply with the decision made during the GMP planning process.

Corr. ID: 1108 **Organization:** Animal Welfare Institute

Comment ID: 93738 **Organization Type:** Conservation/Preservation

Representative Quote: Of course, these are not the only relevant NPS Policies. Other relevant policies dictate that the NPS maintain as parts of the natural ecosystems of parks all native plants and animals. Draft EIS at 1-37. The NPS is directed to achieve this objective by "preserving and restoring the natural abundances, diversities, dynamics, distributions, habitats, and behaviors of native plant and animal populations and the communities and ecosystems in which they occur." Id. Furthermore, NPS Policies specify that the NPS must "adopt park resource preservation, development, and use management strategies that are intended to maintain the natural population fluctuations and processes that influence the dynamics of individual plant and animal populations, groups of plant and animal populations, and migratory animal populations in parks." Id. Admittedly, given the small size of VFNHP and the significant development surrounding the park, restoring a completely naturally functioning ecosystem may not be possible.

That does not, however, provide a green light for engaging in massive manipulation of the ecosystem rather, it poses a challenge, to develop management strategies that allow natural process, fluctuations, and dynamics to function, to the fullest extent possible, given the circumstances.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93705

Organization Type: Conservation/Preservation

Representative Quote: In this case, while the Draft EIS is clearly biased in favor of the preferred alternative and lethal deer control, there is nothing overt in the document that would suggest that the NPS has already decided to implement lethal management. Where the NPS erred, however, is in its General Management Plan/Environmental Impact Statement (GMP/EIS) planning process. In particular, in its GMP/EIS Record of Decision completed in September 2007, the NPS selected action includes the following decision: The park's biological resources will be managed to promote preservation and restoration of the natural abundances, diversities, dynamics, and distributions of native plants and animals. This will be accomplished through active environmental restoration. GMP/EIS/RoD at 2 (emphasis added).

This is an affirmative decision. The NPS did not say that the biological resources "may" or "could" be managed to promote preservation and restoration of the natural abundances, diversities, dynamics, and distributions of native plants and animals. Instead, the NPS made a decision in September 2007 that those biological resources "will" be managed to achieve those objectives.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93713

Organization Type: Conservation/Preservation

Representative Quote: NPS made decisions about transportation corridor development and maintenance in its 2007 GMP/EIS. These decisions included road closures and the use of traffic calming measures (i.e., reduced speed limits, signage, road surfaces that encourage slower speeds, increased signage and signals to control traffic movements, Draft EIS at 4-4) to slow traffic in certain areas which will, among other things, affect deer-vehicle collisions. Given the concern over deer-vehicle collisions, the fact that public safety issues are one of the factors driving the NPS decision-making process in regard to deer management, and considering that transportation issues clearly qualify as connected (i.e., interdependent parts of a larger action), cumulative (i.e., have cumulative significant impacts), and similar (i.e., have similarities with other proposed agency actions) actions, the NPS should have deferred decisions regarding transportation management, particularly in regard to those specific actions that impact deer, to the Draft EIS process.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93715

Organization Type: Conservation/Preservation

Representative Quote: Of greater concern is the fact that the NPS failed to acknowledge in the Draft EIS that it has decided to prepare a vegetation management plan at some time in the future. This decision was made in 2007 as part of the NPS GMP/EIS (see GMP/EIS/RoD at 8). Specifically, the NPS, in order to "take action to accelerate natural recovery through biological and physical remedial actions" decided to among other things, develop in the "future" a "vegetation management plan." GMP/EIS/RoD at 8. The vegetation management plan "will determine the best means to manage infestations of exotic invasive plants, as well as how to achieve subsequent revegetation of forests and meadows." GMP/EIS/RoD at 8.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93723

Organization Type: Conservation/Preservation

Representative Quote: Not only did the NPS fail to properly define the scope of the Draft EIS, particularly by failing to combine deer and vegetation management decisions in the same document, but it didn't even disclose the fact that it has decided to prepare a vegetation management plan which, by definition, will include efforts to manage

infestations of exotic species and to revegetate forests and meadows. As a consequence, the NPS has illegally segmented the action into smaller component parts thereby simplifying the environmental analysis. By so doing, the NPS has attempted to avoid the preparation of a comprehensive EIS evaluating both deer and vegetation management (and arguably other issues) in the same document as required by NEPA.

RESPONSE:

The National Park Service (NPS) is authorized and directed to prepare general management plans for each park unit. A purpose of a general management plan/environmental impact statement (GMP/EIS) is to identify and clearly describe specific resource conditions to be achieved, and to identify the kinds of management that would be appropriate in achieving and maintaining those conditions. For Valley Forge National Historical Park (Valley Forge NHP), the policy set forth in NPS *Management Policies 2006* Section 4.4 was adopted regarding biological resource management. The decisions made as part of the GMP/EIS planning process, including the decision to reflect current NPS management policies for biological resource management, are appropriate to that level of planning. The Record of Decision for the GMP/EIS notes that a "future deer management plan/EIS would determine the best means to manage the size of the white-tailed deer herd," thereby appropriately deferring alternatives for and decisions about the goals, objectives, and methods of management to this White-tailed Deer Management Plan/Environmental Impact Statement (plan/EIS).

The GMP/EIS called for a number of future implementation plans and actions, including a vegetation management plan and traffic studies. These activities are identified in the Cumulative Impact Scenario beginning on page 4-4 and addressed throughout the cumulative impact analysis in the plan/EIS.

PN2000 - Purpose And Need: Park Purpose And Significance

CONCERN ID: 19745

CONCERN STATEMENT: Commenters stated that the purpose of the park does not support the purpose for the plan/DEIS, or the proposed management actions.

REPRESENTATIVE QUOTE(S): **Corr. ID:** 1108

Organization: Animal Welfare Institute

Comment ID: 93789

Organization Type: Conservation/Preservation

Representative Quote: The purpose of VFNHP, as specified in the enabling legislation, is "to authorize the Secretary of the Interior to enter into an agreement with the Valley Forge Historical Society... to construct and operate a museum within the boundary within the boundary of Valley Forge National Historical Park ..." PL 106-86, Sec. 201 (October 13, 1999). Section 202 of this public law includes details regarding the development and operation of the museum. Section 203, pertain to the preservation and protection of VFNHP, and specifies that neither the Secretary nor the Society (Historical Society) can take any actions "in derogation of the preservation and protection of the values and resources of Valley Forge National Historical Park."

None of this language, including the language in Section 203 of PL 106-86, authorizes the NPS to permit the proposed massive slaughter of deer within VFNHP. The language in Section 203 pertains to actions taken by the Secretary and/or the Society in regard to the affirmative decisions it makes to develop and operate the museum which is the primary purpose of the VFNHP. While the NPS may attempt to claim that Section 203 provides it with the authority to engage in the lethal control of deer, the Public Law must be read in its entirety in order to understand its meaning. When this is done it is clear that Congress, in 1999, was solely establishing the purpose of the VFNHP to construct and operate a museum to educate the public about the historical significance of George Washington's occupation of this area in 1777-1778. Even if Section 203 could be interpreted to apply to deer, it would apply to actions taken by the NPS (i.e., decisions to construct roads, trails, concession stands, renovation of historical structures) to ensure that those decisions don't adversely impact the preservation and protection of park resources not to decisions not made by the NPS (i.e., electing not to engage in any active management of deer).

Corr. ID: 1108**Organization:** Animal Welfare Institute**Comment ID:** 93790**Organization Type:** Conservation/Preservation

Representative Quote: While the purpose of VFNHP as contained in the park's enabling legislation is not relevant here, the purpose of the Draft EIS, as previously referenced, "is to develop a deer management strategy that supports protection, preservation, and restoration of native vegetation and other natural and cultural resources throughout and beyond the life of this plan/EIS." Draft EIS at 1-2. As this purpose statement was concocted as part of the NEPA planning process, it has no relevance to the "purpose" of VFNHP. Consequently, though the NPS may attempt to claim that the "purpose" referenced as a basis for the management objectives is the purpose of the Draft EIS, this makes no sense since it has no relevance to the fundamentally legal mandates governing the management of VFNHP.

RESPONSE:

The legislation cited by the commenter (PL 106-86) is not the legislation which established Valley Forge National Historical Park. As described on page 1-11 of the plan/EIS, Public Law 94-337, the park's enabling legislation, was signed by President Ford in 1976, and established Valley Forge as a unit of the National Park System. Park purpose, significance and mission are fully described in the park's GMP/EIS (NPS 2007j).

As stated on pages 1-11 and 1-12 of the plan/EIS, the purpose of the park is to educate and inform present and future generations about the sacrifices and achievements of General George Washington and the Continental Army at Valley Forge, and the people, events, and legacy of the American Revolution; preserve the cultural and natural resources that embody and commemorate the Valley Forge Experience and the American Revolution; and provide opportunities for enhanced understanding.

The GMP/EIS goes on to describe significant natural resources and the cultural significance of the types of vegetation (forest and field), vegetation patterns throughout the park, and specific vegetative features (e.g., vegetative screenings, commemorative plantings). These elements of the natural environment and cultural landscape are reflected in the plan/EIS objectives (pages 1-2 and 1-3) and described in Section 3.2 Natural Resources (beginning on page 3-2) and Section 3.3.1 Cultural Landscapes (beginning on page 3-29). Therefore, the objectives laid out in the plan/EIS, to promote the protection, preservation and restoration of native plant communities and other natural and cultural resources, are consistent with the purposes of the park.

CONCERN ID:

19746

CONCERN STATEMENT:

Commenters stated that the park was created for historical interpretation, and not a nature preserve, feeling that wildlife management is outside of the park's purpose.

REPRESENTATIVE QUOTE(S):**Corr. ID:** 23**Organization:** *Not Specified***Comment ID:** 92155**Organization Type:** Unaffiliated Individual

Representative Quote: The mission of the Park is above all historical. The plant life is important and certainly valuable, BUT the Park must be committed to presenting the story of what happened in 1777-78 above any other goal or aspect of Park management. Again, the funds for deer control might be better used to help fulfill the historical mission of the Park. Perhaps try to schedule more one day seminars as is now being done, or use the funds to bring eminent scholars to the Park to talk about 1777-78 and the Revolution in general.

Corr. ID: 64**Organization:** I can't seem to deselect "member"**Comment ID:** 93622**Organization Type:** Unaffiliated Individual

Representative Quote: Valley Forge is a national historic park, not a nature preserve. Stay true to the needs of the park and focus your efforts - and money - where they are supposed to be.

Corr. ID: 557**Organization:** *Not Specified***Comment ID:** 91921**Organization Type:** Unaffiliated Individual

Representative Quote: The park is NOT a nature preserve. It is a National Historic Park - it's purpose is to educate about through it's monuments, historic buildings (many of which are in need of repair, something the park claims it can't afford to do), and visitor center. Wildlife management should NOT be a part of the park's planning or a draw on the park's funds.

RESPONSE:

See response to PN2000 – Purpose and Need: Park Purpose and Significance, Concern ID 19745 (page F-29).

PN3000 - Purpose And Need: Scope Of The Analysis**CONCERN ID:** 19747**CONCERN STATEMENT:**

Commenters stated that the analysis in the plan/DEIS was lacking and did not demonstrate that the proposed management actions were necessary. Specifically, they stated that other factors, such as climatic factors, canopy structure, seed production, soil moisture, edge effects, auto emissions, and erosion - all of which affect forest regeneration - were not explored within the plan/DEIS.

REPRESENTATIVE QUOTE(S):**Corr. ID:** 14**Organization:** *Not Specified***Comment ID:** 91944**Organization Type:** Unaffiliated Individual

Representative Quote: Although deer are a part of the forest equation, a Penn State University professor said that the issues involving forest ecology and regeneration are complex with many contributing variables.

"Deer have been villainized, but in many cases forest soils are a bigger problem than the deer," he said.

"I've worked with forest soils, trees and acidic precipitation long enough to know that soil plays a critical role in the welfare of plants," he says. "You can't just assume that when a plant starts disappearing, it is caused by deer browsing."

He also said, "Without all of the acid in the soil, plants and trees would grow enough that the number of deer browsing would not make a difference.

Corr. ID: 958**Organization:** *Not Specified***Comment ID:** 93026**Organization Type:** Unaffiliated Individual

Representative Quote: I realize the growing deer population is a problem in Valley Forge Park. To destroy 80% of the herd, however, seems like overkill. They have a right to be here, too. Can't you limit the sharpshooting to a lower percentage -- say 40%? Perhaps we could then evaluate the situation and determine whether we have culled the herd to a manageable number --taking into account the fact that auto emissions, nearby construction and tourists also must account for some percentage of the damage.

Corr. ID: 1108**Organization:** Animal Welfare Institute**Comment ID:** 93761**Organization Type:** Conservation/Preservation

Representative Quote: Consequently, while deer inevitably will impact the habitat in which they live, climatic factors can have an even more dramatic impact to vegetation viability. Indeed, depending on climatic data and patterns in the VFNHP area over time, the NPS may be blaming deer for the alleged impacts to forest health when it should be blaming, in part, the weather.

Corr. ID: 1108**Organization:** Animal Welfare Institute**Comment ID:** 93760**Organization Type:** Conservation/Preservation

Representative Quote: Climatic data. The NPS includes limited information about climate change and its expected impacts on Pennsylvania and its forests and other

habitats in the Draft EIS. It also reports that the Piedmont physiographic province of Pennsylvania, where VFNHP is located, receives average annual precipitation of 46 inches. Draft EIS at 3-1.

No additional information about precipitation amounts, precipitation patterns, precipitation trends, ambient air temperature, temperature extremes, and/or temperature trends are disclosed in the Draft EIS. Considering the direct link between precipitation, temperature, and vegetation viability, composition, abundance, and quality, this omission of information is glaring and illegal. In addition, considering that a reduction in precipitation or an increase in temperature can impact vegetation growth characteristics, reduce soil moisture, or increase evapotranspiration, these changes can have a drastic impact on vegetation, including forest health. Even if average precipitation amounts have remained the same over time, changes in the timing of precipitation events with a reduction of precipitation during the growing season, can drastically impact vegetation health and productivity.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93779

Organization Type: Conservation/Preservation

Representative Quote: This is based on, among other things, the presumption that as the forest herbaceous and shrub layers return, forests experience successful regeneration, and nectar plants return to meadows, wildlife communities would be provided with more, high quality forage. Draft EIS at 4-45. This presumption ignores the wide range of other factors influencing forest regeneration (canopy structure, seed production, seed viability, temperature, precipitation, soil moisture holding capacity), wildlife species recovery (assuming they are in need of recovery at all)(increase in predators, edge effects, microhabitat conditions), and meadow production (temperature, precipitation, soil conditions, erosion, public use). To claim that by simply initiating a large scale reduction in the deer population that this will solve all other factors that may be at play in controlling the ecological dynamics and processes within VFNHP is nonsensical.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93741

Organization Type: Conservation/Preservation

Representative Quote: Though the NPS has attempted to highlight the alleged adverse impacts of deer within VFNHP throughout the Draft EIS, it has failed to disclose sufficient data or to provide adequate analysis to substantiate the purpose of this action. While the NPS cites to a number of studies, many are not of deer in VFNHP. Thus, while those studies may provide information and evidence about deer impacts to forests and other resources elsewhere, it is unknown how similar those study sites are to VFNHP and whether the two sites are comparable. For those studies that involve deer in VFNHP many are more than 10 years old and may no longer accurately reflect deer biology/ecology or impacts on their habitat.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93721

Organization Type: Conservation/Preservation

Representative Quote: In addition, the NPS also concedes that park forests with the greatest number of long-term monitoring plots are located in the dry oak forest type and in the successional tuliptree forest type. Regeneration in such forests may be related to the periodicity of seed production by overstory trees. Draft EIS at 2-27. For example, the NPS cites to the tuliptree (yellow poplar) as an example of a tree species that has good seed crops almost annually but whose seed viability is seldom more than 5 percent. Conversely, oaks have a good seed crop at 3-5 year intervals but, bumper acorn crops occur irregularly and may be as infrequent as 10 years apart. Id. Thus, in addition to the impact of closed canopies on forest regeneration, the species of tree present, its seed production, and its seed viability also may impact regeneration. Deer, it appears clear, are only one of many factors potentially impacting forest regeneration.

Corr. ID: 1108**Organization:** Animal Welfare Institute**Comment ID:** 93767**Organization Type:** Conservation/Preservation

Representative Quote: It fails to disclose, however, any evidence of whether and how climate change has or is impacting vegetation, wildlife, or other attributes (natural and cultural) within VFNHP.

Corr. ID: 1131**Organization:** Cummings School of Veterinary Medicine, Tufts University**Comment ID:** 93254**Organization Type:** University/Professional Society

Representative Quote: Often, the DEIS is internally inconsistent in its treatment of deer population parameters, with figures apparently chosen to support different messages in different contexts. At 1-15, for example, the DEIS describes a range of annual mortality rates at VFNHP of 17-29%. When discussing requirements for number of does to be treated in administration of fertility control, the bottom of that range (17%) is selected; then finally, in the Appendix E discussion of population management efficacy of fertility control (E-5), the site-specific numbers are discarded entirely, and mortality rates are described as "very low (approximately 10%)." The DEIS also asserts (3-19) that deer birth rates at the park are likely to be similar to those reported for WMU 5 outside the park (1.8 embryos per year); this seems unrealistically high, given the reportedly high densities of deer at VFNHP, and at least some data suggesting that deer at VFNHP may be smaller and grow more slowly than other deer in PA (3-20).

More generally, at 3-12 3-19, the DEIS asserts that "the deer population has increased, and in the absence of any population management measures, this trend is expected to continue over time..." This is, at best, a stretch. Figure 10 suggests a rapid and steady rise from 1986-1995, but after that time the numbers fluctuate around 400 deer, with perhaps a rise to 600 and a fall back to 400 from 2001-2005. (Given the methodology, some of this fluctuation could easily be accounted for by behavior shifts.) Figure 11, which covers a shorter time span, suggests a rise from 1997-2003, and then a fall to 2007. But neither data set suggests that continued increase is inevitable, or even probable.

All these small distortions collectively serve to weaken any case for the application of fertility control as a population control agent.

RESPONSE:

The NPS states on page 1-2, that other factors may affect tree regeneration, such as forest canopy, nonnative invasive species, pests/disease, and fire; however, this plan focuses on the role and impact of white-tailed deer in the ecological environment, which has been documented through research and long-term monitoring at Valley Forge NHP.

The impacts of climate change on vegetation in the park vary from season to season and year to year, but are consistent across the entire park at any given time. Our vegetation monitoring indicates that between 1993 and 2003, the number of fenced monitoring plots exhibiting adequate tree regeneration increased from 3% to 30%. The paired unfenced plots, where climate change impacts are the same as in fenced plots, have not exhibited adequate tree regeneration since 1995. The only real difference is the presence or absence of deer.

Please refer to pages 1-36 and 1-37 for a full description of how impacts related to climate change were addressed in the plan/EIS. NPS states on page 1-37, that Pennsylvania's climate has already begun changing in noticeable ways. Many of the specific effects, the rate of change, and the severity of impacts are not known. However, it is reasonable to expect that, given some of the documented climate changes in Pennsylvania to date, park resources are already experiencing changes and stresses associated with climate change, and that climate change can be expected to affect the park during the life of this plan and beyond. With regard to the impacts of climate change on deer management in Valley Forge NHP, the impact topics of vegetation and wildlife analyzed in this plan/EIS may be affected by climate change, as well as actions proposed under any of the alternatives. Therefore, climate change is incorporated into the cumulative impact analysis for the impact topics of Vegetation and Special Status Plant

Species, as well as Other Wildlife, Wildlife Habitat, and Special Status Animal Species in Chapter 4: Environmental Consequences.

A brief description of forest fragmentation as a factor influencing vegetation has been added to the plan/EIS in Section 1.5.4 Other Vegetation Management Issues. Regarding edge effects, please also refer to AE10010 – Affected Environment: Vegetation and Special Status Species, Concern ID 19654 (page F-61).

Other factors, such as canopy structure, would be addressed through the adaptive management approach. Adaptive management is based on the assumption that current resources and scientific knowledge are limited. Nevertheless, an adaptive management approach attempts to apply available resources and knowledge and adjusts management techniques as new information is revealed. For example, as described on page 2-48, should ongoing monitoring indicate that there were factors other than deer that were limiting forest regeneration, adjustments would be made to the existing vegetation management. These adjustments could include silvicultural treatments, nonnative species management, or responses to the effects of global warming. Please refer to Section 2.9 on page 2-46 for a full description of the adaptive management process.

The commenter is correct that over the two decades deer have been studied at Valley Forge NHP, a range of mortality rates have been reported (17%-29%). However, the NPS has used a 17% mortality rate when "discussing requirements for number of does to be treated in administration of fertility control" because this represents the most recent information available on deer mortality rate in the park.

In Appendix E, reference to deer mortality rates as "very low (approximately 10%)" is in reference to suburban deer populations in general and within this context it was not appropriate to use park-specific data/mortality rate.

CONCERN ID: 19748

CONCERN STATEMENT: Commenters questioned the purpose and need of the plan/DEIS, stating that the NPS did not show that native vegetation, wildlife, or cultural landscapes were being impacted to justify these statements. They also stated that forest regeneration was not a need, as it is occurring in the park and that there should have been more of a balance between flora and fauna presented.

REPRESENTATIVE QUOTE(S):

Corr. ID: 936

Organization: *Not Specified*

Comment ID: 93192

Organization Type: Unaffiliated Individual

Representative Quote: The plan states, "The purpose of the plan/EIS at Valley Forge NHP is to develop a deer management strategy that supports protection, preservation, and restoration of native vegetation and other natural and cultural resources throughout and beyond the life of this plan/EIS. The purpose of the plan/EIS also is to provide appropriate response to chronic wasting disease at Valley Forge NHP."

The plan also states, "Forest regeneration has been selected as the primary measure of plan success (PGC 2006b)."

"Why is forest regeneration selected as the primary measure of the plan's success and not a balance between the natural flora and fauna in Pennsylvania that exists within the boundaries of Valley Forge NHP? Does one believe that forest regeneration in itself will also provide a view of the health of the white-tailed deer herd? Or the health of any of the other animals that survive in the park? If so, please provide supportive evidence."

Corr. ID: 978

Organization: The Humane Society of the United States

Comment ID: 93118

Organization Type: Conservation/Preservation

Representative Quote: A review of the literature concerning deer and their impacts on individual plants, their populations and communities found that there are virtually no studies that examine the plant population and ecosystem level effects of white tailed

deer herbivory. In fact, many studies have detected no overall effects on plant survival and reproduction and so called negative effects have only been observed on small temporal and spatial scales. It is also ironic that as recently as 1988, researchers were claiming that "[a]lthough the white tailed deer population within the park is not regulated and predation pressure is minimal, the herd has not adversely affected park vegetation." Proving that deer do, in fact, eat is a far cry from definitively proving that they are endangering the continued survival of a forested ecosystem.

The EIS also repeatedly states that deer are hampering forest regeneration at VFNHP. Generally, the term "regeneration" implies a re-growth or reestablishment after a disturbance or loss, hence the prefix "re-" which means "back" or "again". Throughout the EIS, it appears that the Park simply desires a carpet of seedlings and saplings in the absence of any disturbance. This requirement does not truly amount to regeneration in that the canopy is still intact. In the event that a tree were to fall and the canopy were to open, studies have shown that the mounds and pits formed by such events provide long-term refugia for seedling regeneration, even in the presence of intense deer herbivory.

However, the HSUS is aware that the park considers the deer populations at VFNHP to be "overabundant" and that such population levels may be viewed as "unnatural". This idea of native wildlife damaging its environment and necessitating lethal removal is held by some to be a logical consequence of that perception and by others to be illogical. This lethal removal scheme may be viewed as a contradiction to the central mission of NPS, which is to not intervene in natural processes unless a compelling case can be made that they have been suspended or prevented through human action. As the forest appears to regenerate itself after disturbance, it is difficult to understand how a lack of seedling under intact canopy constitutes a suspension of natural processes.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93740

Organization Type: Conservation/Preservation

Representative Quote: The need for the action is "to address declining forest regeneration and to ensure the production and restoration of native vegetation, wildlife, and the cultural landscape." Draft EIS at iii, 1-2. This need is further defined by the increasing number of deer in the park causing unacceptable changes in the species composition, structure, abundance, and distribution of native plant communities and associated wildlife; prevention of successful forest regeneration; and an elevated risk of chronic wasting disease occurrence within the park. Draft EIS at iii, 1-2.

For this need to be valid, the NPS has to disclose sufficient evidence that forest regeneration is declining and that native vegetation, wildlife, and the cultural landscape is in need of restoration as a result of damage attributable to deer. The NPS has also failed to meet this burden.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93739

Organization Type: Conservation/Preservation

Representative Quote: The NPS defines the purpose of the "this action (as) to develop a deer management strategy that supports protection, preservation, and restoration of native vegetation and other natural and cultural resources throughout and beyond the life of this plan/EIS." Draft EIS at cover page, 1-2.

For this purpose to be valid there must be, in addition to the legal authority for the NPS to act, evidence that the deer population within VFNHP is damaging the native vegetation and other natural and cultural resources to such an extent that action is necessary to protect, preserve, and restore these resources by regulating, including potentially by lethal means, the park's deer herd. The NPS has failed to meet this burden.

RESPONSE:

As indicated in the plan/EIS on page 1-3, the purpose of the plan/EIS is to develop a deer management strategy that promotes the protection, preservation, and restoration of native vegetation and other natural and cultural resources. The need for action statements are

based on park data demonstrating an increasing trend in deer abundance over the past two decades and changes in native plant communities, including tree regeneration. A full risk assessment, providing the justification for inclusion of chronic wasting disease (CWD) is provided in Appendix C of the plan/EIS.

Information on trends in deer population size is provided on pages 1-14 and 3-11. Park data indicate that between 1986 and 2009, the deer density in the park has increased from 31-35 deer per square mile to 241 deer per square mile.

As described on pages 1-17 and 3-11, in 1992, 30-paired vegetation monitoring plots (15 fenced, 15 unfenced) were erected within the park's forests to detect changes in the abundance and species composition of the forest understory plant community over time. Between 1993 and 2003, the number of species present in fenced plots increased 27-32%, and the number of species in unfenced plots decreased 6-15%. In 2003, unfenced plots generally contained about one-third the number of tree seedlings present in fenced plots. These data also revealed that in unfenced plots adequate forest regeneration has not occurred since 1995. In fenced plots between 1993 and 2003, the number of plots with adequate tree regeneration increased from 3% to 27%. In 2003, fenced plots contained tree seedlings in all six height categories ranging from 0 to 150 cm (0-59 inches) in height. In 2003, no tree seedlings were found taller than 25 cm (9.8 inches) in unfenced monitoring plots.

The NPS is not justifying a management action based on the effects of deer (browsing, trampling etc.) on other wildlife species or cultural landscape elements, such as earthworks. Tree regeneration has been selected as the metric used to evaluate plan success rather than wildlife diversity or specific elements of the cultural landscape. It is through the protection of native plant communities that the NPS proposes to protect and preserve other native wildlife species and cultural landscapes in the park. Information provided on the impacts of white-tailed deer on these resources is based on referenced scientific literature and consultation with technical experts, and the NPS believes it fully substantiates the plan/EIS purpose, need for action, and objectives.

PN4000 - Purpose And Need: Park Legislation/Authority

CONCERN ID: 19751

CONCERN STATEMENT: Commenters questioned the legal authority of the NPS in relation to use of lethal actions to reduce the size of the deer population. Commenters also stated that the EIS does not provide a substantial purpose and need for lethal deer removal under current NPS management philosophy and guidelines. Some stated that the objectives presented were not grounded in the park's enabling legislation, purpose, significance, and mission goals, as is required, and that the objectives resulted in NPS having to select alternatives C or D. Other commenters questioned the policies that allow management of native species, and further stated that the impairment standard cannot be applied legally to a native herbivore in a national park. One commenter also questioned whether CWD was a native organism and how NPS policies might apply.

REPRESENTATIVE QUOTE(S): **Corr. ID:** 978 **Organization:** The Humane Society of the United States

Comment ID: 93122 **Organization Type:** Conservation/Preservation

Representative Quote: In summary, The HSUS believes that the EIS does not provide a substantial purpose and need for lethal deer removal under current NPS management philosophy and guidelines. With little evidence to suggest that deer have truly altered this ecosystem and prevented its perpetuation, it is incumbent upon the NPS to justify the killing of native wildlife in the absence of sustained threats to the VFNHP ecosystem.

Corr. ID: 1108 **Organization:** Animal Welfare Institute

Comment ID: 93726 **Organization Type:** Conservation/Preservation

Representative Quote: In the Draft EIS, the NPS contends that the third element, the impairment standard, is the basis for its authority to engage in a large-scale lethal deer

kill within VFNHP. Draft EIS at 1-37, 4-1. This interpretation of the Organic Act is simply wrong. At best it is a self-serving attempt to use the Organic Act's impairment standard to justify plans such as VFNHP's deer kill, Rocky Mountain National Park's elk shooting program, and other actions in other parks targeting wildlife for lethal control. At worst, the NPS is intentionally manipulating the historic interpretation of the Organic Act to permit actions to occur within units of the national park system that are entirely contrary to intent of Congress when it established the NPS.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93791

Organization Type: Conservation/Preservation

Representative Quote: The significance and mission of the VFNHP could not be immediately determined though, consider the purpose of the VFNHP as specified in the park's enabling legislation, it is unlikely that either the significance or mission of the park justifies these management objectives. Furthermore, given time restraints, these objectives could not be compared to the standards included in the VFNHP's 2007 GMP. However, even if there is agreement between the standards articulated in the GMP and these management objectives, that does not, by itself, suggest that these objectives are justified since the GMP was likely revised as, in part, the foundation for implementing a deer management plan, and specifically, lethal deer control.

Moreover, though it is clear that the management objectives are not consistent with VFNHP's enabling legislation, purpose, significance, or its mission goals, it is also clear that they were developed largely to be self-serving by justifying the NPS preferred alternative which calls for the large-scale slaughter of deer. Not surprisingly, the NPS uses the management objectives as a measure of the reasonableness of the various alternatives evaluated in the Draft EIS with Alternatives A and B determined not to meet the objectives while Alternatives C and D do satisfy the objectives. Furthermore, these objectives provide additional evidence of the bias of the Draft EIS against deer and of the predetermined outcome of this decision-making process.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93736

Organization Type: Conservation/Preservation

Representative Quote: Given the lack of natural deer predators in VFNHP and the claim that the park and surrounding areas provide high quality deer habitat, the NPS believes, based on policy, it is permitted to engage in the lethal management of the park's deer herd. Assuming NPS policies were limited to those cited above (and that the policies themselves were consistent with NPS statutory and regulatory authority), the NPS must prove that its intervention will not cause "unacceptable impacts to the population of the species or to other components and processes of the ecosystems that support them" and that it is unable to mitigate the "human influences" that created the unnaturally high or low population concentration.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93788

Organization Type: Conservation/Preservation

Representative Quote: The NPS states that "objectives for managing deer populations must be grounded in the park's enabling legislation, purpose, significance, and mission goals, and must be compatible with the direction and guidance provided by the park's general management plan." Draft EIS at iii.

A careful review of each of these criteria reveal that they do not support the proposed lethal destruction of large numbers of deer in VFNHP, that they are silent on the issue of deer management and control, or that the NPS has effectively manufactured select criteria to use them to justify its proposed management action.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93725

Organization Type: Conservation/Preservation

Representative Quote: Of particular relevance here are the second and third of these

requirements. The second requirement imposes a conservation mandate on the NPS. This mandate applies to scenery, natural and historic objects, and the wild life therein. There is nothing in this second mandate that can be interpreted to allow one element (e.g., scenery) to be favored over another (e.g., wild life) in regards to conservation. Moreover, considering the "natural regulation" mandate of the NPS where nature is supposed to be permitted to regulate ecological dynamics of park unit, the mere fact that deer may be affecting forest regeneration and/or the composition, abundance, distribution, and structure of vegetation in a park is not sufficient to justify the wholesale slaughter of a particular species.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93765

Organization Type: Conservation/Preservation

Representative Quote: While AWI questions the conclusion that CWD is a nonnative disease among cervids, of greater consequence for the NPS is whether CWD is a native organism. If it is, NPS Policies and legal mandates may not permit its extirpation. This is not to suggest that AWI desires to see CWD spread throughout this nation's deer or other ungulate population but, rather, it is to make the point that the NPS cannot simply elect to extirpate a native species solely because it is consistent with state policy.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93707

Organization Type: Conservation/Preservation

Representative Quote: The Draft EIS relies on similar language in describing the NPS objectives in taking action to manage the deer population. Specifically, the NPS objectives include protecting and promoting the restoration of the "natural abundance, distribution, structure, and composition of native plant communities by reducing deer browsing" and maintaining "a white-tailed deer population within the park that allows for protection and restoration of native plant communities." Draft EIS at 1-3. The Draft EIS, not surprisingly, concludes that Alternatives A and B will not meet these objectives since "implementation of any of the nonlethal actions alone would be insufficient to address forest regeneration and would not meet the objectives of the plan/EIS," Draft EIS at 2-23. In other words, only Alternatives C or D can, according to the NPS, achieve the objectives delineated in the Draft EIS. This conclusion should be of no surprise since this outcome was identified and decided in the GMP/EIS/RoD.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 92716

Organization Type: Conservation/Preservation

Representative Quote: Based on the evidence, or lack thereof, presented in the Draft EIS, AWI is not convinced that the massive removal of deer through sharpshooting or capture and euthanasia is necessary to properly manage the VFNHP. That evidence, as presented in the Draft EIS, demonstrates that the park's deer population is decreasing in size, that the deer population is in the process of reaching an equilibrium consistent with the park's ecological carrying capacity, that the park has sustained and continues to sustain a high density deer population, that park deer occupy relatively small home ranges (suggesting higher quality habitat), that Chronic Wasting Disease is not an immediate threat to deer in VFNHP, that the NPS may not have the legal authority to eradicate the disease, that non-lethal reproductive controls can be implemented immediately, and that mitigation measures are available and would be successful in addressing the alleged threats to special status plant species.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93735

Organization Type: Conservation/Preservation

Representative Quote: Without evidence that visitor use has been adversely impacted because of the deer population and since the impairment standard cannot be legally applied to a native herbivore in a national park, the NPS has no legal authority to implement the preferred alternative and slaughter a large number of deer. In fact, the NPS may not have the legal authority, regardless of any evidence documenting the detrimental impact of an animal on public use, to engage in a large-scale slaughter of

native animals. Again, if the Organic Act is read and interpreted in its entirety, the only way the "destruction of animals" authority provided in 16 USC §3 is consistent with the conservation mandate contained in 16 USC §1 is if the former was intended to be used sparingly and only against specific animals.

RESPONSE:

The NPS believes that the plan/EIS is in compliance with the Organic Act and associated implementing regulations and policies, as well as the enabling legislation for the park. The NPS also believes that the plan/EIS fully and sufficiently discloses data that substantiates the purpose and need for action. (Refer to Concern ID 19748 on page F-26 regarding park-specific data supporting the purpose and need for action.) The objectives of the plan/EIS were developed in support of the plan purpose and need for action and the NPS believes they are fully compliant with the park's enabling legislation, purpose, significance, and mission goals as described in the park General Management Plan/EIS (NPS 2007j). All alternatives presented in the plan/EIS met the plan objectives to some degree. How well each alternative met the plan objectives is provided in Table 6 of the plan/EIS (page 2-61).

As described on pages 1-3 and 1-4, the NPS has broad authority to manage wildlife and other natural resources within the boundaries of units of the national park system. As stated in 16 USC § 1, the NPS, "shall promote and regulate the use of Federal areas known as national parks ...by such means and measures as conform with the fundamental purpose of the parks...to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations". In defining this discretion, the 10th Circuit Court of Appeals overturned a district court decision in *New Mexico State Game Commission v. Udall* (410 F.2d 1197, 1201), holding in part that the NPS "need not wait until the damage through overbrowsing has taken its toll on park plant life ... before taking preventative action" (10th Cir. 1969). This discretion has been reinforced over time.

NPS Management Policies 2006, Section 4.4.2.1, allows for the management of native species to prevent them from interfering broadly with natural habitats, natural abundances, and natural distributions of native species and natural processes. *NPS Management Policies 2006*, Section 4.4.2, also states that the NPS will rely on natural processes whenever possible, but may intervene to manage wildlife or plant populations under certain conditions. One such condition is when "a population occurs in an unnaturally high or low concentration as a result of human influences (such as the extirpation of predators and the creation of highly productive habitat through urban landscapes) and it is not possible to mitigate the effects of the human influences." Since the deer population at Valley Forge NHP is increasing at a rate that reflects the absence of effective predation and presence of high quality habitat found in the park and surrounding areas, active management of the species is permitted, including population reduction or lethal removal of individuals from a population.

NPS Management Policies 2006, Section 4.4.2.1, further states that, "[w]hen the Service removes native plants or animals, manages plant or animal populations to reduce their sizes, or allows others to remove plants or animals for an authorized purpose, the Service will seek to ensure that such removals will not cause unacceptable impacts on native resources, natural processes, or other park resources. Whenever the Service identifies a possible need for reducing the size of a park plant or animal population, the Service will use scientifically valid resource information obtained through consultation with technical experts, literature review, inventory, monitoring, or research to evaluate the identified need for population management..." A full analysis of impacts is provided in Chapter 4: Environmental Consequences.

Sections 1.4.4 to 1.4.7 of the *NPS Management Policies 2006* provide guidance for the evaluation of potential impacts to park resources. Those sections recognize that the source of the impacts that may lead to impairment can arise from a variety of causes. The guidance does not indicate that impacts leading to impairment could not be caused by a

native species. *NPS Management Policies 2006* also allow for considerable discretion on the part of the park manager in determining whether or if impairment exists. As noted in *Management Policies 2006*, "Whether an impact meets this definition depends on the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts."

One commenter also questioned whether CWD was considered a native organism. The NPS states on page C-1 that "although the precise origin of CWD will probably never be determined, it is strongly suspected that CWD is a nonnative disease among cervids."

CONCERN ID: 19922

CONCERN STATEMENT: Commenters questioned the legal authority of the park in relation to the protection of state-listed species.

REPRESENTATIVE QUOTE(S): **Corr. ID:** 1108 **Organization:** Animal Welfare Institute

Comment ID: 93769 **Organization Type:** Conservation/Preservation

Representative Quote: Though the NPS claims that it has a duty to consider state-listed or protected species when making management decisions, the NPS fails to disclose the legal significance of a state listing. In other words, what specific prohibitions apply to the management of use of lands where state-listed species exist under state law? This question is not intended to discount the significance of the state-listing of these species and/or their fragility, but only to seek additional information about the legal significance of a state-listing.

RESPONSE:

Discussion regarding the legal obligation of the NPS to manage state-listed species has been clarified in Chapter 4 (see page 4-14). The NPS does not have a legal obligation to manage for state-listed species. However, it is required by the Organic Act to, "conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations." In addition, *NPS Management Policies 2006* Section 4.4.2.2 state that, "the National Park Service will...manage state and locally listed species in a manner similar to its treatment of federally listed species to the greatest extent possible.

Section 4.4.2.2 of the *NPS Management Policies* provides for consideration of state species in the conduct of NPS activities. Specifically, "The National Park Service will inventory, monitor, and manage state and locally listed species in a manner similar to its treatment of federally listed species to the greatest extent possible. In addition, the Service will inventory other native species that are of special management concern to parks (such as rare, declining, sensitive, or unique species and their habitats) and will manage them to maintain their natural distribution and abundance. The Service will determine all management actions for the protection and perpetuation of federally, state, or locally listed species through the park management planning process, and will include consultation with lead federal and state agencies as appropriate." In including the consideration of impacts to state listed species within this document, the NPS is in compliance with NPS policies.

PN8000 - Purpose And Need: Objectives In Taking Action

CONCERN ID: 19752

CONCERN STATEMENT: Commenters stated that the purpose and need for taking action presented in the plan/EIS is incorrect, citing that CWD is not a concern in this area and is not a threat to deer populations.

REPRESENTATIVE QUOTE(S): **Corr. ID:** 62 **Organization:** Friends of Animals

Comment ID: 93593 **Organization Type:** Conservation/Preservation

Representative Quote: The Pennsylvania Gaming Commission stated on their web site that CWD (Chronic Wasting Disease) has NOT been found in any of the deer in Pennsylvania so reducing herds for this reason has no effect on the herds in Pennsylvania.

Corr. ID: 358

Organization: *Not Specified*

Comment ID: 93433

Organization Type: Unaffiliated Individual

Representative Quote: Most of the park's reasons for calling the deer a problem are inaccurate or invalid. For example, chronic wasting disease is no threat what so ever as far as deer numbers are concerned. CWD has NOT even been reported anywhere in PA. Not to mention, indiscriminately reducing the number of deer in a park has never been show to impact CWD rates. (source: <http://www.pgc.state.pa.us/pgc/cwp/view.asp?a=458&q=163873>)

RESPONSE:

The NPS has stated on page C-5 of Appendix C: CWD Response Plan for Valley Forge NHP, that no cases of CWD have been confirmed in Pennsylvania. Similar language has been added on pages 1-44, 2-14 and C-2 of the plan/EIS for clarification in the body of the document.

A full risk assessment, providing the justification for inclusion of CWD in the plan/EIS is provided in Appendix C. As stated on page C-5, the entire state of Pennsylvania is considered to be at high risk for the introduction of CWD, due to the presence of the disease in an adjacent state. The need for action presented in the plan/EIS is based on changes in the proximity of CWD to the park boundary. As described in Appendix C, CWD was thought to be isolated to the west and midwest regions of the United States, until 2005, when it was confirmed in both New York and West Virginia. This places the closest confirmed case of CWD only 200 miles from the park boundary. NPS believes data used in the plan/EIS is sufficient to justify plan/EIS purpose and need for action related to CWD.

CONCERN ID:

19754

CONCERN STATEMENT:

Commenters stated that the objectives of the plan/DEIS should focus more strongly on the historical justification for deer management, and the impacts deer have on historically important vegetation.

REPRESENTATIVE QUOTE(S):

Corr. ID: 1018

Organization: Valley Forge Citizens for Deer Control

Comment ID: 92450

Organization Type: Conservation/Preservation

Representative Quote: 4. The EIS is missing an important historical justification for deer reduction directly related to deer destruction of the Park's woodlands.

The negative effect of excessive deer browse in the Park's woodlands is the destruction of an important interpretive linkage between various flora species and the use of such species by the Continental Army.

The woodlands have a medical connection to the Continental Army. The Army's first pharmacopoeia developed in Lititz in the spring of 1778 by Dr. William Brown to treat various illnesses of the soldiers specified woodland ingredients for medical compounds. Tree species in the Park present in these compounds include the Sassafras tree (bark, wood & root), the Sugar maple (for its syrup), and White pine (for its pitch). The pharmacopeia also specified use of the roots of herbaceous plants found in the woods: Wild licorice; Sarsaparilla; Snakeroot; Wild ginger.

In addition, the woodlands have a practical connection to the Continental Army. Gen. Washington gave an encampment order specifying roof shingles be made of split oak, and at least five species of oak are found in the woods. Wagons of the era, such as Army supply wagons, used hickory for wheel hubs and single-trees. Bark from the American Chestnut was used as the principal supply of tannin for the leather industry, and thus was likely used for military straps, belts, etc. Black walnut was the preferred wood for rifle or musket gunstocks because it is dimensionally stable. Sycamore was the preferred wood used for butcher blocks because its curved grain is highly resistant to splitting, and thus was likely used by encampment butchers to carve meat rations for the troops.

The above is just a sample of the historical interpretive possibilities of the Park's woodlands with regard to the Valley Forge encampment of 1777-78.

RESPONSE: The purpose of the plan/EIS is to develop a deer management strategy that promotes the protection, preservation and restoration of native vegetation and other natural and cultural resources (page 1-2). Important natural elements of the cultural landscape, such as the pattern of open versus wooded habitat, are described in Section 3.3.1 Cultural Landscapes of the plan/EIS. Tree regeneration has been selected as the measure of plan success rather than plant diversity or the presence/absence of specific plant species that may have occurred historically (1700's). Actions that support plan/EIS objectives related to native vegetation would be sufficient to protect and preserve those native species referred to by the commenter that still occur in the park today. In other cases, as described on page 1-24 of the plan/EIS, species such as the American Chestnut will likely never occur in the park again regardless of deer density.

CONCERN ID: 19870
CONCERN STATEMENT: One commenter stated that preventing deer-vehicle collisions should be included as an objective in taking action.

REPRESENTATIVE QUOTE(S): **Corr. ID:** 872 **Organization:** Audubon Pennsylvania
Comment ID: 92939 **Organization Type:** Conservation/Preservation
Representative Quote: During 2007, Audubon Pennsylvania, commissioned an independent statewide survey of the general public across Pennsylvania asking citizens to rank deer management goals in the order of their priority. Managing deer to promote healthy, sustainable forest ecosystems was the number one goal identified for deer management by the public and by hunters, followed by minimizing conflicts with humans (Reed Haldy McIntosh 2003). Both of these efforts suggest that the most important deer management goal for the people of Pennsylvania is for deer to be managed to allow for healthy forest ecosystems and to reduce deer/human conflicts.

RESPONSE: The plan/EIS purpose is to develop a deer management strategy to promote the protection, preservation, and restoration of native vegetation and other natural and cultural resources. As described on page 1-2, the plan/EIS objectives are what must be achieved to a large degree for the action to be considered a success. The action alternatives selected for detailed analysis must resolve the purpose of and need for action and meet the plan objectives. Objectives related to deer-vehicle collisions were not developed because they are not relevant to the plan/EIS purpose and need for action. Please note that deer-vehicle collisions are addressed under sections related to Public Safety throughout the document. Chapter 4: Environmental Consequences, provides a full evaluation of the impacts of implementation of deer management alternatives on public safety, including the likelihood of being involved in a deer-vehicle collision. Refer to Section 4.7: Public Safety (beginning on page 4-84).

AL2070 - Alternatives: Alternative Eliminated - Capture and Relocation

CONCERN ID: 19673
CONCERN STATEMENT: One commenter questioned whether the studies referenced regarding capture and relocation were conducted in Pennsylvania and, if not, do they remain relevant to the decision not to accept translocation as a viable alternative.

REPRESENTATIVE QUOTE(S): **Corr. ID:** 936 **Organization:** Not Specified
Comment ID: 93221 **Organization Type:** Unaffiliated Individual
Representative Quote: Were the studies conducted by Coffey and Johnston, DeNicola and Swihart and Warren performed in Pennsylvania? If not, are they relevant?

RESPONSE: As stated in NPS *Management Policies 2006*, Section 4.1, "decisions about the extent and degree of management actions taken to protect or restore park ecosystems or their components would be based on clearly articulated, well-supported management objectives and the best scientific information available." No park-specific data related to

capture and relocation of white-tailed deer exists and, in part, because the Pennsylvania Game Commission does not support capture and relocation as a deer management tool in Pennsylvania, no data from areas surrounding the park is available. Although the references cited by the commenter are not specific to Pennsylvania, the information/data presented is considered applicable to white-tailed deer in general, regardless of the state in which they occur. NPS *Management Policies 2006*, Section 4.4.2.1, states that information may be obtained through "consultation with technical experts, literature review, inventory, monitoring, or research to evaluate the identified need for management..." The NPS believes that the information presented in the plan/EIS is sufficient to justify elimination of capture and relocation as a reasonable alternative.

AL2100 - Alternatives: Use of Volunteers for Lethal Actions

CONCERN ID: 19674

CONCERN STATEMENT: One commenter stated that the NPS is obligated to revisit the question of whether qualified volunteers should be part of the deer management solution.

REPRESENTATIVE QUOTE(S): **Corr. ID:** 972 **Organization:** Safari Club International

Comment ID: 93094 **Organization Type:** Conservation/Preservation
Representative Quote: In summarily rejecting the use of qualified volunteers for deer population reduction in Valley Forge National Historical Park, the NPS has ignored valid evidence of a strategy that is being successfully and economically employed for deer management. SCI and SCIF strongly recommend that it is the NPS's responsibility to give adequate consideration to a tool that could enhance the preferred alternative designated by the EIS. Before issuing a Final EIS, the NPS is obligated to revisit the question of whether qualified volunteers should be part of the deer management solution.

RESPONSE: The Secretary of the Interior has broad discretion in managing wildlife. Section 4.4.2.1 of NPS *Management Policies 2006* states that the destruction of animals may be carried out by NPS personnel or their authorized agents. In some situations, authorized agents can be volunteers. However, the NPS has determined that Valley Forge NHP is not an NPS unit conducive for the use of public volunteers as authorized agents of the park for the purposes of handling firearms.

On page 2-12 of the plan/EIS, NPS states that volunteers would not be involved in activities involving the use of firearms for the purposes of lethal removal. The justification for this decision is provided on page 2-13, and is based on the nature of development on the park boundary, nature of the unconfined recreational activities in the park, presence of landform restrictions which would not enable complete closure of access, and related safety concerns. As stated in the plan/EIS, although volunteers would be excluded from using firearms, they may assist in other activities such as the transport and processing of carcasses, maintenance of bait stations, and implementing park closures (page 2-13). Therefore, as described on page 2-37 of the plan/EIS, use of firearms for the purposes of lethal removal would be carried out by qualified federal employees or contractors with demonstrated expertise and training in the implementation of successful wildlife/deer management actions including firearms handling, storage, and proficiency, lethal removal techniques, and wildlife capture and handling.

Additional details have been added to Section 2.5.1 Use of Volunteers and throughout the document as appropriate, to clarify how volunteers would be used to implement both lethal reduction and reproductive control and to provide general volunteer training requirements and/or qualifications.

AL2160 - Alternatives: Alternative Eliminated - Surgical Reproductive Control

CONCERN ID: 19675

CONCERN STATEMENT: Commenters stated that the dismissal of surgical reproductive control of does based on mortality rate wasn't consistent with the proposed removal of deer in the park and that the effectiveness of this procedure in other locations was not considered. Further, another

commenter stated that sterilization ensures the continuity within the social framework of the herd.

**REPRESENTATIVE
QUOTE(S):**

Corr. ID: 961

Organization: *Not Specified*

Comment ID: 93083

Organization Type: Unaffiliated Individual

Representative Quote: A typical example of confused thinking can be found under "Surgical Reproductive Control" (2.10.3). The draft plan states that surgery in the field to eliminate reproduction was "considered but rejected" for the following reasons: 1) because it would take "a great deal of time per deer," 2) because "the number of deer that would need to be treated makes it technically unfeasible" and 3) "the mortality rate associated with the procedure (6%) is greater than the acceptable level of mortality for this procedure (5%)." Using the figures in the draft plan once again means that if 6% of the 460 females assumed to belong to the herd died, there would be 27 or 28 deaths while the acceptable number of deaths for this procedure is only 23. Your solution to this problem is for sharpshooters to kill 450 -550 deer.

Corr. ID: 978

Organization: The Humane Society of the United States

Comment ID: 93127

Organization Type: Conservation/Preservation

Representative Quote: While the EIS briefly discusses the option of surgical sterilization, it quickly dismisses it as infeasible. And yet, from 2002-2005, the city of Highland Park, Illinois conducted a trap sterilize release program on the city's deer. In that study, does were sterilized through tubal ligation so they were not susceptible to the behavioral alterations typical of methodologies that halt hormone production. This methodology was both safe and humane and resulted in very low mortality rates due to surgery. Computer models of surgical sterilization from this and other research revealed that areas can maintain their deer populations at target densities by sterilizing 32% of the does per year. Based upon these results, VFNHP may do well to reconsider surgical sterilization as a viable option for deer management.

Corr. ID: 978

Organization: The Humane Society of the United States

Comment ID: 93132

Organization Type: Conservation/Preservation

Representative Quote: Sterilization is superior to lethal control in that it leaves animals in a population as "placeholders" that are reproductively "dead ends" yet continue to occupy consistent home ranges and exhibit natural herding behaviors. The presence of these adult "placeholders" ensures continuity in the social framework of the herd while limiting the number of young and more mobile animals that might pose increased risks of collisions with vehicles and dispersal to adjoining private properties.

RESPONSE:

An alternative may be considered but dismissed from detailed evaluation if its implementation would be [remote and] speculative. There is little scientific information available in the published literature evaluating the use of surgical sterilization as a deer management tool. Existing research has focused on computer modeling or implementation in relation to small, isolated, low density deer populations and is not considered directly applicable to the large, free-ranging, high density deer population at Valley Forge NHP. Relevant studies are referenced in the plan/EIS. Language in the plan/EIS, Section 2.10.3: Surgical Reproductive Control, has been updated to provide additional details presented in the referenced literature and to include dismissal of surgical reproductive control in combination with other actions.

As stated on page 2-53 of the plan/EIS, Mathews et al. (2005), concluded that sterilized deer in Highland Park, IL died at a significantly higher rate than control [unsterilized] deer. Higher mortality associated with surgical sterilization is considered by the NPS to be a valid justification for elimination of this action, as well as being consistent with how other alternatives presented in the plan/EIS were evaluated. The fundamental assumption of a management alternative such as surgical sterilization would be the use of non-lethal methods to manage the deer population. Mortality associated with use of a "non-lethal" method is an important consideration in the evaluation of alternatives. Similarly, lethal

methods that were not considered highly successful in humanely removing animals from a population were dismissed from further consideration (e.g., predator reintroduction).

The NPS has been unable to identify any source documenting the commenter's suggestion that sterilized deer serve as a "placeholder" on the landscape, preventing other deer from moving in. Mathews et al. (2005) concluded that sterilized deer moved more than fertile deer. This may negate their effectiveness as placeholders on the landscape.

AL2220 - Alternatives: Alternative Eliminated - Supplemental Feeding

CONCERN ID: 19676

CONCERN STATEMENT: One commenter stated that the plan/DEIS does not provide factual evidence that supplemental feeding would not achieve the desired goal.

REPRESENTATIVE QUOTE(S): **Corr. ID:** 936 **Organization:** *Not Specified*

Comment ID: 93222 **Organization Type:** Unaffiliated Individual

Representative Quote: 2.10.7 Supplemental Feedings

Providing supplemental food to deer is often suggested as a way of reducing damage to natural or ornamental vegetation. However, increasing food sources through supplemental feeding could increase survivability and reproduction in the deer population, thus compounding problems that already exist.

"The plan is hypothesizing in this statement and showing no relevant supportive facts.

" If factual evidence is available please make the data available for public review prior to making a decision on how to move forward with the draft.

Providing alternative food sources may provide temporary relief from browsing on plants needing protection but would not provide a long-term solution.

" If the farming were sustained, why would it not be a long-term solution? Again, statements are being put forward without supportive or factual evidence. Please provide evidence for the aforementioned statement in this draft.

In addition, supplemental feeding on a parkwide basis would be logistically and economically impractical (Maryland DNR 2002). For these reasons, supplemental feeding was dismissed as a management option.

RESPONSE: Supplemental feeding was considered but dismissed as a deer management alternative in Section 2.10.7 of the plan/EIS. The NPS believes that the information presented is sufficient to eliminate supplemental feeding as a reasonable alternative; however, additional references have been included in the plan/EIS to lend support to the dismissal justification (see page 2-55). No scientific evidence could be found to suggest that in large, free-ranging deer populations supplemental feeding could reasonably be expected to allow the park to achieve its target level of tree regeneration.

AL3000 - Alternatives: Envir. Preferred Alt./NEPA §.101&102

CONCERN ID: 19678

CONCERN STATEMENT: One commenter questioned the validity of the environmentally preferred alternative, based on the six criteria established by NEPA Section 101(b).

REPRESENTATIVE QUOTE(S): **Corr. ID:** 1108 **Organization:** Animal Welfare Institute

Comment ID: 93782 **Organization Type:** Conservation/Preservation

Representative Quote: These are the objectives that the NPS attempts to use in defining an environmentally preferred alternative. The problem is that the objectives related to the policy which pertains to the profound impact of man on the environment. Thus the objectives are applicable to human impacts and influences on the environment. For example, the fifth objective which calls for achieving a balance between population and resource use is referring to the human population not, as the NPS attempts to claim in the Draft EIS, to the deer population in VFNHP. Similarly, the third objective does not apply

to any alleged degradation of the environment caused by a wildlife species, like deer, as it applies to degradation attributable to human use of the environment. While some of the objectives can be more easily applied to wildlife than others, doing so represents a complete misinterpretation of the objectives and their intent as specified in the statute. Thus the NPS assessment of the environmentally preferred alternative in the Draft EIS is entirely useless as it is based on a misinterpretation of the statutory language.

RESPONSE:

In accordance with NPS Director's Order 12: Conservation Planning, Environmental Impact Analysis, and Decision-making, and the National Environmental Policy Act (NEPA), the NPS is required to identify the environmentally preferred alternative in its NEPA documents. The Council on Environmentally Quality defines the environmentally preferred alternative as the alternative that will promote the national environmental policy as expressed in NEPA's Section 101. As discussed in Section 2.12: Environmentally Preferred Alternative in the plan/EIS, ordinarily, this means the alternative that causes the least damage to the biological and physical environment, and the alternative which best protects, preserves, and enhances historic, cultural, and natural resources. The NPS stands by its selection of the environmentally preferred alternative as presented in Section 2.12 of the plan. Alternative C best protects the biological and physical environment by ensuring an immediate reduction in deer population numbers that could be sustained with proven methods over the life of the plan. Section 2.11: Consistency with Sections 101(b) and 102(1) of the National Environmental Policy Act has been clarified to better present a discussion of how each alternative meets the six criteria of NEPA Section 101 and to distinguish that section from the identification of the environmentally preferred alternative in the following section.

AL4000 - Alternatives: New Alternatives Or Elements

CONCERN ID: 19681

CONCERN**STATEMENT:**

Commenters stated that the plan/DEIS did not contain a reasonable range of alternatives. They further stated that the range of alternatives presented were too similar to each other to be an adequate range. Commenters provided alternative elements to be analyzed within the plan/DEIS. Alternative elements stated by commenters generally fell into three categories: (1) actions outside the scope of the plan/EIS and/or do not contribute to achieving the purpose, need and objectives of the plan/EIS; (2) actions the park is already involved in or have already been addressed in the plan/EIS; and (3) actions not within the authority of the NPS to undertake.

REPRESENTATIVE QUOTE(S):

Corr. ID: 64

Organization: I can't seem to deselect "member"

Comment ID: 93618

Organization Type: Unaffiliated Individual

Representative Quote: As someone who frequently drives through the park, I can safely say deer are not a problem in reference to deer-car collisions unless one is speeding (and the speed limit should be reduced to 25 mph to reflect the fact that the park is a residential area for the wildlife that live there). And in those cases, the person speeding is the problem not the deer! As a side note, deer-car collisions peak on the first day of hunting season because they deer run in fright anywhere they can to escape the hunters (insurance statistics prove this).

Corr. ID: 492

Organization: Not Specified

Comment ID: 91747

Organization Type: Unaffiliated Individual

Representative Quote: Course taken should be less development in and around the park. We need people and development control - not animal control.

Corr. ID: 506

Organization: Friends of Animals, Inc.

Comment ID: 93345

Organization Type: Conservation/Preservation

Representative Quote: Coyotes are beginning to re-establish themselves in the area. Should these natural predators gain a presence in the Park, they will remove some of the young, and also the sick, and thus check the deer numbers while promoting health in the deer. Unlike larger predators, coyotes could do well in the range Valley Forge Park provides.

The EIS in fact acknowledges that animals of some species to whom deer are a food source, including foxes and coyotes, could benefit from high deer density and open understory conditions. Other animals, such as box turtles, vultures, crows, and chickadees, may also eat deer carcasses. Small predators, such as foxes, hawks, owls, and skunks may also benefit from a more open understory, as prey would be easier to find.

The coyote population will, of course, take time to rebound, but this means we should promote their role in the ecosystem of our region. These predators, rather than be considered vermin by local residents, must be encouraged to prosper and to keep the ecological balance intact. The park administrators could and should diligently publish information to promote safety and respect for coyotes.

Corr. ID: 554 **Organization:** *Not Specified*

Comment ID: 93649 **Organization Type:** Unaffiliated Individual

Representative Quote: If the park says that it's concerned about deer/vehicle collisions then I say why is the average speed through the park 48 mph and why, in the last year, have I not seen a park ranger or other police officer stop a single vehicle near the park on Route 252, Route 23 or Walker Road. Speeders leaving the park treat the two schools on 252 and Walker Road like they don't even exist.

Corr. ID: 554 **Organization:** *Not Specified*

Comment ID: 91914 **Organization Type:** Unaffiliated Individual

Representative Quote: Try an experiment, everyone: drive no more than 25 mph through the park, even at night and in the rain, and see if you can even imagine hitting a deer at that low speed. I doubt that you can.

Corr. ID: 573 **Organization:** *Not Specified*

Comment ID: 91954 **Organization Type:** Unaffiliated Individual

Representative Quote: We suggest developing a broader, more thoughtful plan to address the multiple causes of environmental damage to the park area. Specifically, in terms of control of the deer population as one aspect of the plan, the park managers should consider a less aggressive, less damaging approach. For example, pilot an intervention to reduce the deer population by 25-30 % over the next 2 years, while using contraceptives and strategic fencing to control the population.

Corr. ID: 627 **Organization:** *Not Specified*

Comment ID: 92036 **Organization Type:** Unaffiliated Individual

Representative Quote: If you are so concerned with the park's appearance, why don't you shut down the highway that runs through the park?

Corr. ID: 757 **Organization:** *Not Specified*

Comment ID: 92498 **Organization Type:** Unaffiliated Individual

Representative Quote: "Designated areas" for deer herds would protect the herd and also make it easier to control their reproductive activity because you would know where they are and would better understand their behavior. It would also create better interaction between deer and man.

Corr. ID: 936 **Organization:** *Not Specified*

Comment ID: 93211 **Organization Type:** Unaffiliated Individual

Representative Quote: Volunteers could assist in the implementation of most elements included in the action alternatives, including closing off areas to the public or assisting in the removal and processing of deer carcasses.

From a budgeting perspective, especially considering the economic state our country and region are in at this moment in 2009, it is clear that based on only having these four alternatives, Alternative A is the most fiscally responsible.

" It would be helpful to understand what a variation of Alternative A, with incorporated farming or test farming of crops to help provide a food source for the fauna, would be estimated at. Please consider this prospect and provide some discussion for it pro and con.

Corr. ID: 946 **Organization:** *Not Specified*

Comment ID: 93113 **Organization Type:** Unaffiliated Individual

Representative Quote: As a national park, Valley Forge has the opportunity to take a leadership role in implementing responsible development that takes wildlife into account. Since a growing number of people are concerned about this issue, such innovations could, of themselves, make the park a destination for many. First, we need to establish the premise that deer have as much right to be here as we do. Let's focus on creative and practical ways to avoid conflicts with them, as we also nurture the expansion of other native species. The park can sponsor programs to foster respect for wildlife and encourage the spread of native species. Instead of surrounding our homes with little artificial environments, suburbanites can learn to create woodlands on private property and incorporate the trees and plants that are already here into our yards, as well as choose plants that won't attract deer to places where they're unwelcome.

In addition, the park can add to its mission protection and expansion of open space near the park. The Park could work with land grant trusts to preserve any existing open space close to the park and connecting land bridges between open areas so animals can access these. It can also take a role in educating the public on the value of careful land management, and encourage alternative ways of generating revenue for the county instead of building more shopping complexes and hotels.

Corr. ID: 946 **Organization:** *Not Specified*

Comment ID: 93111 **Organization Type:** Unaffiliated Individual

Representative Quote: Vehicle collisions can better and more humanely be eliminated by creating safe means of passage for all wildlife. We need culverts under roads for animals to cross safely, speed bumps at wildlife crossings where culverts can't be built and enforced reduced speed limits in and near the park

Corr. ID: 949 **Organization:** *Not Specified*

Comment ID: 92931 **Organization Type:** Unaffiliated Individual

Representative Quote: Volunteers could replant saplings.

Corr. ID: 953 **Organization:** GeesePeace

Comment ID: 93106 **Organization Type:** Conservation/Preservation

Representative Quote: Use salt substitutes along roads for deicing or use sand. Salt attracts deer to the roadways and forest edge increasing herbivory at the forest edge and incidence of deer vehicle collisions. When salt substitutes are used deer will spend less time in the vicinity of roadways. Reduced use of sodium chlorine will also improve stream water quality.

Corr. ID: 953 **Organization:** GeesePeace

Comment ID: 93107 **Organization Type:** Conservation/Preservation

Representative Quote: Mix seeds from desirable native plants with the corn in the 4-poster system so that deer disperse seeds in forest exterior with their feces.

Corr. ID: 953 **Organization:** GeesePeace

Comment ID: 93104 **Organization Type:** Conservation/Preservation

Representative Quote: Within each open space used for food, shelter or browse place one "4-poster" tick elimination station. "The 4 poster" was developed by the USDA Agricultural Research Service and has resulted in 98% tick reduction. <http://www.ars.usda.gov/is/AR/archive/may01/lyme0501.htm>. Considering the size of the herd, the tick reduction will be rapid and broad ranging as deer move about the park meadows and forested areas. After three to five years the tick population will be so low that Lyme disease

will not be considered a significant issue. Paradoxically, the more deer there are in the area the more effective is the 4-poster system.

The benefit of using the 4-poster and elimination of the risk of Lyme disease is worth taking the very small risk that deer feeding at the 4-poster will spread CWD. The transmission of CWD between deer and the environment is yet unknown, although direct contact is one of suspected mechanisms. Furthermore CWD is not present in the Valley Forge herd, whereas ticks infected with Lyme disease are very likely.

Also, the trough at each end of the 4-poster is very small, which means only one deer at a time will feed at either end.

Corr. ID: 955 **Organization:** *Not Specified*

Comment ID: 93017 **Organization Type:** Unaffiliated Individual

Representative Quote: If we want to protect the vegetation, plant more mature specimens. If we want to protect other fauna from starvation, promote even more plants.

Corr. ID: 993 **Organization:** *Not Specified*

Comment ID: 92620 **Organization Type:** Unaffiliated Individual

Representative Quote: DEER/CAR collision/accidents Educate the public. To avoid accidents; reduce speed during deer peak season and at dawn and dusk. Abide by the safe driving speed limits; refrain from talking and texting on cell phone or using Ipods while driving in high risk areas. Here are some other proven means to deter deer from entering the roadway:

- Install "Streiter lights" These lights are engineered to reflect the light from car headlights. In approaching these unnatural moving light patterns deer have been observed to either retreat or wait until the lights cease and cross safely. See: <http://www.strieter-lite.com/index.html>

- Install Deer Fencing

- Post deer signs in high traffic areas; increase public outreach and announcements

Corr. ID: 993 **Organization:** *Not Specified*

Comment ID: 92617 **Organization Type:** Unaffiliated Individual

Representative Quote: UNDERSTORY IN THE PARK Choose green options. To minimize the impact of deer browsing on the Woods' understory, use various forestry techniques to spur forest growth. Fertilize soil to overwhelm the deer with more browse than they can eat; spread lime to counter the acidity in the soil (as a result of acid rain) which impedes forest growth; install temporary, movable fencing of select parcels to allow for patch regrowth and prune select overstory trees to allow for more sunlight and rapid understory growth.

There are also a variety of solutions, such as multi-strand solar-powered (or non-solar powered) electric fencing, 8 foot woven wire fence, and various netting options, along with aversive conditioning devices such as electronic stakes and motion-activated garden hoses that squirt deer with a blast of water.

Corr. ID: 1089 **Organization:** *Not Specified*

Comment ID: 93548 **Organization Type:** Unaffiliated Individual

Representative Quote: Sierra Club would like to include in park monitoring BBC, CBC, PBA to see if bird populations change with deer control.

Corr. ID: 1093 **Organization:** *Not Specified*

Comment ID: 93464 **Organization Type:** Unaffiliated Individual

Representative Quote: I am concerned about Lyme. Why would the ticks leave the deer?

Why not treat the deer for ticks? Why not treat the mice for ticks?

There is a township near here that does this (treats deer for ticks) using bait. It is also available for mice.

With no deer, or less deer, might there be more ticks on other hosts?

Corr. ID: 1108 **Organization:** Animal Welfare Institute

Comment ID: 93706 **Organization Type:** Conservation/Preservation

Representative Quote: In describing the basis for its decision, the NPS provides the following explanation:

Within forested and other naturally occurring biological communities, the NPS will actively manage the park's biological resources in order to preserve and restore natural abundances, diversities, dynamics, and distributions of native plants and animals. In cases in which species populations occur in unnaturally high or low concentrations as a result of human influences or extirpations of predators, and these occurrences cause unacceptable impacts on natural resources and processes, the NPS will take action to accelerate natural recovery through biological and physical remedial actions. This includes a future vegetation management plan that will determine the best means to manage infestations of exotic invasive plants, as well as how to achieve subsequent revegetation of forests and meadows. A future deer management plan/EIS will determine the best means to manage the size of the white-tailed deer herd. GMP/EIS/RoD at 8 (emphasis added).

While the NPS may claim that the last sentence in this cited paragraph demonstrates that had not predetermined the outcome of the Draft EIS, this claim cannot withstand even limited scrutiny. Most importantly, it is contradicted by the affirmative decision reflected in use of the word "will" in the GMP/EIS/RoD. In other words, the NPS decided that it will use physical remedial actions to manage the deer herd to "accelerate natural recovery" and to "to promote preservation and restoration of the natural abundances, diversities, dynamics, and distributions of native plants and animals."

Corr. ID: 1108 **Organization:** Animal Welfare Institute

Comment ID: 93752 **Organization Type:** Conservation/Preservation

Representative Quote: NEPA regulations require federal agencies to "rigorously explore and objectively evaluate all reasonable alternatives ..." 40 CFR 1502.14(a). The range of "reasonable alternatives" must include a no action alternative, id. at 1502.14(d), and "reasonable alternatives not within the jurisdiction of the lead agency." Id. at 1502.14(c). The NPS has failed to meet this requirement in the Draft EIS.

The Draft EIS offers four alternatives; Alternative A (no action); Alternative B (combined nonlethal action); Alternative C (combined lethal actions); and Alternative D (combined lethal and nonlethal actions). While each of these alternatives includes different components, in many cases the alternatives are so similar in structure and impact that they are effectively the same.

Corr. ID: 1108 **Organization:** Animal Welfare Institute

Comment ID: 93714 **Organization Type:** Conservation/Preservation

Representative Quote: Had it done so then, in addition to the traffic calming measures that the NPS has decided to implement, it could have considered other management strategies that would have further addressed the issue of deer-vehicle collisions (i.e., additional road closures, creation of additional speed zones, use of reflectors or other technologies to frighten deer or warn motorists when approaching dangerous road sections, temporary signage to promote caution, altering vegetation planting/maintenance procedures on roadways to discourage deer use, creating deer under or overpasses). Inexplicably, though the NPS could have included such additional options in the Draft EIS, it has elected to simply defer to the decision made as part of the GMP planning process.

Corr. ID: 1108 **Organization:** Animal Welfare Institute

Comment ID: 93795 **Organization Type:** Conservation/Preservation

Representative Quote: Furthermore, the NPS has failed to seriously consider alternative strategies to mitigate some of these alleged impacts such as the use of non-palatable species when needed for landscaping or commemorative purposes, the installation of fencing systems that may better blend into the surrounding landscape to reduce any visual impacts, or the preparation of educational materials explaining the history of white-tailed deer in America and, specifically, in the Valley Forge area to make the deer part of the park's history lesson.

Corr. ID: 1108 **Organization:** Animal Welfare Institute

Comment ID: 93718 **Organization Type:** Conservation/Preservation

Representative Quote: Given these statements and recognizing that many of the forests in VFNHP are, according to the NPS, closed canopy forests, the NPS would be well advised to consider the option of selective tree removal to increase sunlight access to the forest floor to stimulate forest production. Indeed, it must consider such an option before it implements a massive deer kill as proposed or, at a minimum, those options should be considered together. That would not change the opinion of AWI in regard to its opposition to the lethal deer control proposal but it would reflect a recognition on the part of the NPS that there are an abundance of factors, not just deer that are likely affecting forest regeneration.

Corr. ID: 1108 **Organization:** Animal Welfare Institute

Comment ID: 95930 **Organization Type:** Conservation/Preservation

Representative Quote: Furthermore, the NPS has not proven that it can't mitigate for the "human influences" that created the alleged overabundance of deer in VFNHP. In this case, while the NPS can't undo the excessive development that has occurred outside of VFNHP, it can engage in mitigation measures (i.e., use of rotational fencing within the park, planting of unpalatable ornamental species when needed for landscaping or commemorative purposes, acquisition of additional lands, support for conservation easements with local landowners to provide additional/improved deer habitat, use of various non-lethal techniques to reduce deer-vehicle collisions, use of non-lethal reproductions controls, and extensive educational efforts to increase tolerance for deer) to increase tolerance for deer both within and outside of VFNHP.

Corr. ID: 1108 **Organization:** Animal Welfare Institute

Comment ID: 93759 **Organization Type:** Conservation/Preservation

Representative Quote: Management actions outside the park:
In this alternative the NPS would cooperate with the PGC, other agencies, and interest groups to maximize the effectiveness of deer management and education efforts outside of the park. The NPS has the legal authority to consider such an alternative under NEPA. The components of such an alternative could include expanded hunting opportunities for deer outside the park, increased public outreach and education to increase tolerance for deer, installation of various technologies to reduce deer-vehicle collisions, enactment of county ordinances prohibiting the supplemental feeding of deer, creation of regulations or voluntary agreements to close or relocate the captive cervid facilities that existing in Chester and surrounding counties to reduce the potential for CWD transmission to native wildlife. This is not to suggest that AWI would necessarily support this alternative or its individual components, but it is a reasonable alternative that could help address many of the concerns associated with deer in VFNHP.

Corr. ID: 1108 **Organization:** Animal Welfare Institute

Comment ID: 93755 **Organization Type:** Conservation/Preservation

Representative Quote: While three alternatives (recognizing that Alternatives C and D are the same) cannot possibly constitute a "reasonable range" of alternatives, the NPS also erred in failing to consider other reasonable alternatives. Such other alternatives would include a more rapid and aggressive non-lethal alternative (i.e., a modified version of Alternative B), a non-lethal/research alternative, and a emphasize management actions outside the park alternative.

Corr. ID: 1108**Organization:** Animal Welfare Institute**Comment ID:** 93808**Organization Type:** Conservation/Preservation

Representative Quote: Instead of attempting to further vilify deer and to use such inaccurate assessment to persuade people to support the predetermined outcome of this process, the NPS should consider, at a minimum, embarking on a massive educational campaign to educate park visitors and those living outside the park on how to live in harmony with deer including how to protect themselves against Lyme disease and how to reduce the risk of a deer-vehicle collision.

Corr. ID: 1108**Organization:** Animal Welfare Institute**Comment ID:** 93756**Organization Type:** Conservation/Preservation

Representative Quote: Aggressive non-lethal alternative:

This alternative would employ non-lethal contraceptive agents to regulate and reduce the park's deer population. Unlike Alternative B, this alternative would drastically increase the number of employees, contractors, or volunteers available to rapidly administer the appropriate vaccine/agent to a maximum number of female deer each year until the population objective is achieved. At that point, non-lethal management would continue though the number of employees/contractors/volunteers needed to implement the program would decline.

RESPONSE:

The NPS believes that it has developed and presented an adequate range of alternatives within the plan/EIS to satisfy the purpose, need, and objectives of the plan as required by NEPA.

• **Actions outside the scope of the plan/EIS or do not meet the purpose, need, and objectives of the plan/EIS. Examples of commenter suggestions include “treating deer and mice for ticks” and use of the “4-poster system” to eliminate ticks and reduce Lyme disease, lowering the speed limit in the park and other actions to reduce deer vehicle collisions.**

The purpose of this plan/EIS is to develop a deer management strategy that supports protection, preservation, and restoration of native vegetation and other natural and cultural resources. Tree regeneration has been selected as the measure of plan success rather than tick density or number of deer-vehicle collisions. Actions to specifically address tick populations/Lyme Disease and deer-vehicle collisions are outside the scope of the plan/EIS and fail to meet the plan purpose, need, and objectives. However, the impact of proposed alternatives on public safety, including the likelihood of encountering a deer tick and/or being involved in a deer-vehicle collision, are described in Section 4.7 (beginning on page 4-84).

• **Actions the park is already involved in or are addressed in the plan/EIS. Examples of commenter suggestions include park monitoring of bird populations, using volunteers to assist in planting trees and implement deer management actions, providing educational materials on deer, providing habitat for coyote populations, silvicultural treatments (open canopy) to promote regeneration, providing supplemental feeding for deer (incorporated farming), aversive conditioning devices such as electronic stakes and motion-activated garden hoses, and use of the park as a research model for fertility control.**

In spring 2009, the park initiated a long-term, volunteer bird monitoring program to evaluate trends in breeding bird populations parkwide. This program was developed and is being conducted in cooperation with the NPS Inventory and Monitoring Program. Monitoring results would be made available to the public as they become available.

Coyotes were first observed in the park in 2006. The amount of forest and grassland habitat in the park provides conditions (e.g., abundant prey, cover) favorable for coyotes to continue to exist. NPS regulations provide protection from harassment and harvest. However, as indicated in Concern ID 19727 (page F-83), it is through the protection and restoration of native plant communities and thus wildlife habitat that the NPS proposes to protect and preserve other native wildlife species.

Refer to pages 2-9 and 2-12 of the plan/EIS for descriptions of NPS involvement with local

communities and educational materials. Refer to page 2-12 of the plan/EIS for a description of how public volunteers could assist with implementation of the deer management plan.

Supplemental feeding, repellents and other deterrents and use of the park as a research model for fertility control were considered but dismissed because they failed to meet the purpose and objectives of the plan/EIS. Refer to page 2-55.

Refer to page 2-46 of the plan/EIS for a description of the adaptive management approach which includes the potential for adjustments in vegetation management if other factors are determined to be limiting forest regeneration. These adjustments could include silviculture, nonnative species management, or responses to the effects of global warming. Silvicultural treatments would be used if it were determined, for example, that the existing forest structure was preventing sunlight and/or water from reaching new seedlings. If this were the case, additional actions would be taken to provide the necessary resources to promote forest regeneration, such as the creation of canopy openings.

• **Actions not within the authority of the NPS to undertake. Examples of commenter suggestions include closing the highway that runs through the park, limiting development outside the park, and expanding hunting opportunities for deer outside the park.**

The Organic Act provides that NPS shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations; however, it does not provide authority to directly manage lands or resources located on non-federal lands outside the park boundary. Land development outside the park boundary or closing of state roadways is determined by state and local governments. Management of game populations, including white-tailed deer, outside the park boundary, is the responsibility of the Pennsylvania Game Commission (see page 1-19). The park has a long history of working cooperatively with partners in the surrounding community to encourage decision-making that promotes the protection of park resources (e.g., participation with the Valley Creek Restoration Partnership).

Lastly, alternatives that consider different combinations of actions that are already proposed in the plan/EIS were not carried forward because the alternatives presented in the plan/EIS represent the combination the NPS believes most reasonable to implement and with the highest potential to successfully achieve the purpose and objectives of the plan/EIS. These alternatives capture the full range of options required by the Council on Environmental Quality (CEQ). Examples of commenter suggestions include reducing “the deer population by 25-30 % over the next 2 years, while using contraceptives and strategic fencing to control the population,” “creating designated deer areas,” and a “more rapid and aggressive non-lethal alternative” which would require more staff support than Alternative B.

AL4040 - Alternatives: Sharpshooting

CONCERN ID: 19683

CONCERN STATEMENT: One commenter stated that the plan/DEIS does not sufficiently address the dangers and difficulties in sharpshooting activities, while others provided concerns and information about the dangers of sharpshooting. Commenters also stated that closing the roads in the park may be beneficial as deer may run into the roads during sharpshooting activities.

REPRESENTATIVE QUOTE(S):

Corr. ID: 15 **Organization:** *Not Specified*

Comment ID: 93816 **Organization Type:** Unaffiliated Individual

Representative Quote: I want point out here, and make sure that it is part of this record, the potential danger and liability to NHP with regard to hiring a firm to shoot high powered rifles on park property. I'm very familiar with the firms that provide sharp shooting services, and I have found that this term in most cases is being improperly applied. For example, below are some safety concerns reported by the National Security Academy that was hired to do the USDA APHIS Wildlife Services 2008 Firearm Safety Review.

1. No uniform method of transporting firearms.

2. An unsafe practice of rounds in the magazine, but not in the chamber was observed and must be addressed.
3. 85% of employees interviewed were deficient in firearm safety and handling training, including live fire training.
4. Only 2% of all employees who use firearms were drug tested.
5. Accidents: Seven cases were cited due to ignorance, negligence, or carelessness.
6. 100% of employees could not name all four Wildlife Services Fundamental Gun Safety Rules.
7. Wildlife Services is being faced with the possibility of hiring Biologists or Field Employees with little or no firearm experience.

This safety report is alarming and raises serious questions about the expert qualifications of these so called sharp shooters. In addition, if the USDA Wildlife Services has these safety concerns, then I can only imagine what the safety issues are with the smaller sharp shooting outfits that aren't required to have an independent safety review.

Corr. ID: 56

Organization: *Not Specified*

Comment ID: 93629

Organization Type: Unaffiliated Individual

Representative Quote: Even in the hands of experts, firearms and compound bows can cause unintended injury and death to human beings and companion animals. What precautions will be taken in the surrounding neighborhoods to ensure the safety of residents when the killing starts? I understand this killing is planned under the cover of darkness, but this wouldn't prevent deer from running into cars that are using the local roads.

Corr. ID: 550

Organization: *Not Specified*

Comment ID: 91893

Organization Type: Unaffiliated Individual

Representative Quote: Even the wildlife biologist consultant on the Deer Mgt Plan for Valley Forge NHP, Michele Batcheller, warned participants on Jan. 15, 2009, in the small group discussion which was part of the Public Hearing @ the plan, that sharpshooters would cause deer to run across roads to escape and into nearby neighborhoods. Is this what motorists or the neighbors want?

Corr. ID: 914

Organization: *Not Specified*

Comment ID: 92906

Organization Type: Unaffiliated Individual

Representative Quote: Using high powered rifles is a danger for visitors to the park, drivers on the public roads through the park, and to nearby residences. Once the shooting starts, won't the deer run out onto Rt. 422?

Corr. ID: 978

Organization: The Humane Society of the United States

Comment ID: 93137

Organization Type: Conservation/Preservation

Representative Quote: Related to this, the EIS does not indicate how it plans to ensure that no visitors are in the park while the proposed sharp shooting would be taking place. While it is easy to close parking lots and post signs, it is not as simple to close off foot trails that traverse the park and enter onto adjacent land. Some hikers do prefer to begin their activities around dawn or plan to stop hiking right around dusk.

Corr. ID: 1017

Organization: *Not Specified*

Comment ID: 92463

Organization Type: Unaffiliated Individual

Representative Quote: The plan fails to recognize the extent of the dangers and difficulties associated with sharpshooting as a management technique.

Corr. ID: 1095

Organization: *Not Specified*

Comment ID: 93545

Organization Type: Unaffiliated Individual

Representative Quote: Deer will run/move during sharpshooting. Close roads?

RESPONSE:

A complete analysis of the impacts of implementing alternatives involving lethal methods (Alternatives C and D) is provided in Chapter 4, including potential impacts related to lethal removal actions and public safety (see pages 4-88 to 4-91). As described on pages 4-88 and 4-89, measures taken to ensure the safety of Valley Forge NHPs visitors during implementation of lethal removal actions would include conducting removal activities at night in late fall or winter months when park visitation is lowest, use of equipment to promote accuracy and safety (e.g., night vision, scope), closing areas to visitors when shooting is required, notifying the public in advance of any park closures, providing exhibits regarding deer management actions in the visitor center, and posting information on the parks website. Park law enforcement personnel would patrol the perimeter areas where sharpshooting would occur to ensure that no visitors (e.g., on foot) or vehicles entered the area. Sharpshooting would not occur within 300 feet of any building within the park boundary or on adjacent land or within 300 feet of an open roadway. Bait would be used to attract deer to safe removal locations. Park staff would approve the location of bait stations before sharpshooting took place. The park would comply with all federal firearm laws administered by the Bureau of Alcohol, Tobacco, Firearms and Explosives. The majority of deer reduction activities would occur during the first two years of this plan, decreasing in scope during ensuing years as the deer population declined. The safety measures used under this alternative would ensure the safety of all employees, visitors, and adjacent property owners.

The plan/EIS suggests that sharpshooting activities may temporarily increase the likelihood of visitors and/or park staff being involved in a deer-vehicle collision (see page 4-89). Actions to reduce this likelihood are described above. However, as the population is reduced and deer reduction activities become less prevalent, a reduction in deer-vehicle collisions could be expected. This impact is similar to that expected to result from implementation of reproductive control of does. Overall, implementation of Alternatives C or D would be expected to have a long-term beneficial impact on public safety as the risk of being involved in a deer-vehicle collision decreased with the decrease in deer population size.

The NPS is familiar with the 2008 U.S. Department of Agriculture-Animal and Plant Health Inspection Service (APHIS) Wildlife Services review. The decision on who would implement lethal management actions in the park would occur using a selection process that rigorously evaluates qualifications (e.g., firearm proficiency), relevant experience, and requires demonstrated success in implementation of similar programs in a safe and efficient manner.

AL4180 - Alternatives: Lethal Reduction - General

CONCERN ID: 19688

CONCERN STATEMENT: Commenters stated that sharpshooting and otherwise lethally removing the deer herd from the park may be ineffective, as more deer may move in from surrounding areas to fill the newly vacant niche, and that an acute reduction in the deer herd will prompt remaining does to breed, causing the population to increase.

REPRESENTATIVE QUOTE(S): **Corr. ID:** 56 **Organization:** *Not Specified*

Comment ID: 93628 **Organization Type:** Unaffiliated Individual

Representative Quote: *To reduce populations, deer kills would have to target does rather than bucks. Even then, nearly 75% of the herd would have to be killed to overcome compensatory reproductive rates (the "rebound" effect that would result from the kill). Even this drastic level of killing would not solve the problem, however, because new animals would simply migrate into the area to take advantage of the vacated habitat and abundant food supply. And thanks to suburban sprawl, there continues to be less deer habitats and this scenario is likely.

Deer kills typically start out with a target number of deer to be killed and that number is rarely met since once the kill starts, deer flee the area and take cover in the deepest woods or in the neighboring suburbs where there is no killing.

* Most deer kills, no matter at what level the initial targets are set; end up with a lower kill level that is offset the following year by the rebound effect. Killing deer is NOT the "magic bullet" to solve this issue.

Corr. ID: 978 **Organization:** The Humane Society of the United States

Comment ID: 93690 **Organization Type:** Conservation/Preservation

Representative Quote: The EIS must also discuss how the park can justify the increased levels of reproduction that are known to occur in *O. virginianus* populations subjected to lethal harvest when alternatives are available.

Corr. ID: 978 **Organization:** The Humane Society of the United States

Comment ID: 93131 **Organization Type:** Conservation/Preservation

Representative Quote: While chemical and physical sterilization has been shown to effectively reduce deer fertility, lethal control may sometimes have the opposite effect. It has been shown that the reproductive rate of *O. virginianus* is greatly reduced at high population densities while deer in areas subjected to periodic harvest have enhanced fertility rates resulting in increased population growth to compensate for harvested animals. Further research also indicates that harvest of both sexes does nothing to stop fluctuations in deer populations due to forage competition and natural mortality as a result of severe winter weather.

Corr. ID: 998 **Organization:** Mobilization for Animals - PA, Inc.

Comment ID: 92611 **Organization Type:** Conservation/Preservation

Representative Quote: I will open by stating that I vehemently object to lethal methods of dealing with human-wildlife conflicts not only have they proven to be scientifically ineffective, they also punish the victims of human encroachment and irresponsibility when it is in fact the human behaviors that should be modified.

I'm sure you've heard of the scientific phenomenon of "compensatory rebound", which refers to marked increase in births in heavily hunted populations, and leads to a never-ending killing cycle. The article about deer in Valley Forge Park, which ran this Sunday (February 15, 2009) in the Philadelphia Inquirer, backs this up again by coming right out and indicating that ongoing shooting would take place basically into eternity.

With mass kills, the deer herd is initially reduced, leaving more food for the remaining deer, which, in turn, leads to increased reproduction. The following spring, there are more deer, not less.

Studies show annual killing does not keep the remaining deer out of gardens, does not reduce Lyme disease and does not decrease deer/vehicle collisions. The inevitable conclusion: Killing does not solve any problem.

I hope you will take all of this into consideration. I can't see justifying the spending of public money on an ongoing 'solution' to deer-human conflicts, which will be perpetual and therefore NOT BY ANY MEANS expeditious or permanent. We must move forward with better land-use planning, slowing of unnecessary development, and other options which are truly a solution.

Corr. ID: 1016 **Organization:** *Not Specified*

Comment ID: 92479 **Organization Type:** Unaffiliated Individual

Representative Quote: There is no scientific, peer-reviewed data to support killing deer - no proof that hunting (sharp shooting) has had a positive impact on deep population in parks that use this method.

Ridley Creek State Park has been hunting every year since 1999, and has also allowed archery hunting as an additional tool to reduce the deer herd in the park. There is no plan to stop killing year after year.

Gettysburg Park used hunting to reduce their deer herd in 1996, 1997, and from 1999 to date. A quote from a public affairs officer, Katie Lawhon, "We are going to have to continue to remove deer from the park. We are not going to become able to get to our goal and then stop. This will have to be an ongoing objective."

Fairmont Park began hunting to cull their deer in 2001 and continues to date. According to wildlife biologists, deer regulate their own numbers in balance with available resources. In times of famine, does will absorb their embryos when food is scarce. When hunting is introduced, in times of plenty, does will increase their reproduction by producing twins and even triplets, as well as begin reproducing at a younger age. This is called a rebound effect.

The void created by hunting in one area will soon be filled in by deer migrating from adjacent areas, eventually drawing deer from other states, perhaps sick ones.

Corr. ID: 1135

Organization: *Not Specified*

Comment ID: 92944

Organization Type: Unaffiliated Individual

Representative Quote: I am writing out of concern about the National Park Service's (NPS) decision to recommend lethal methods to control deer at Valley Forge National Historical Park.

Gunning down deer is a cruel way to manage deer populations. Many deer who are shot are merely wounded, and their deaths can be slow and painful. Mass killings tear apart families, leaving young and weak animals vulnerable to starvation, dehydration, and predators. Lethal methods for deer population control are also ineffective. As long as the areas of concern remain attractive and accessible to these animals, more will move in from surrounding areas to fill the newly vacant niche. In addition, an acute reduction in the deer herd will prompt remaining does to breed, causing the population to increase!

I urge you to halt plans to kill deer at Valley Forge and instead push for long-term deer management methods that are more effective and humane.

RESPONSE:

White-tailed deer have a high reproductive capacity and reproductive rate is considered a primary indicator of deer condition. The plan/EIS states on page 4-35, that under Alternatives C or D, deer reproductive rate would be expected to remain high or to increase over time in adult females. Reproductive rate in fawns and yearlings would be expected to increase over time as deer density was reduced and habitat quality improved. This is considered a long-term beneficial impact, because it would indicate deer are in good or improved condition.

The plan/EIS is intended to guide long-term management of white-tailed deer over the next 15 years and beyond. While the reproductive rate of deer may increase in response to a decrease in the overall population, as stated by commenters, future deer removal actions would take into consideration any population growth (increased reproductive rate, deer moving into park from adjacent lands) and adjust management actions (e.g., number of individuals removed) as needed through the adaptive management process. The adaptive management process is described in the plan/EIS on pages 2-46 to 2-50.

CONCERN ID:

19691

**CONCERN
STATEMENT:**

Commenters made statements regarding the age composition of the deer in the park, and which deer should be targeted with lethal actions, with some questioning the genetic preference to remove does. They also stated that the analysis was not complete and should have considered impacts to the gene pool and long-term impacts on herd health. One commenter stated that the analysis did not consider all relevant studies, citing a study by Chris Dairmont specifically.

**REPRESENTATIVE
QUOTE(S):****Corr. ID:** 506**Organization:** Friends of Animals, Inc.**Comment ID:** 93348**Organization Type:** Conservation/Preservation

Representative Quote: The more highly controlled the environment, the lower the genetic diversity. These changes make no evolutionary sense and ultimately threaten the viability of a species.

The idea that target species evolve in response to predation is not new, but the results of study by Chris T. Darimont et al, "Human Predators Outpace Other Agents of Trait Change in the Wild," encompasses research in the U.S. and Canada taking in decades of observation, and provides new scientific information in a field in which "a comparison of the rate at which phenotypic changes in exploited taxa occurs relative to other systems has never been undertaken." It also explains why this study is of vital importance to a change in the way humans think about managing other animals. Its ramifications will challenge not just on the level of how we should manage them (it describes, for example, the deleterious effects of hunting and the commercial fish trade on evolution), but that we think we can and should manage them in the first place. The authors state that the study is "providing a new appreciation for how fast phenotypes are capable of changing" and that animals targeted by humans "show some of the most abrupt trait changes ever observed in wild populations," and adds: "Specifically, the widespread potential for transitively rapid and large effects on size- or life history-mediated ecological dynamics might imperil populations, industries, and ecosystems."

The study focuses on hunting and commerce, but will clearly be relevant to the problems resulting from human management and control generally.

Corr. ID: 595**Organization:** *Not Specified***Comment ID:** 92012**Organization Type:** Unaffiliated Individual

Representative Quote: A deer management plan should not be implemented by the Park until the potential impacts have been thoroughly evaluated and considered. Has the Park considered the impact of indiscriminately killing off 80% of the herd on the gene pool? What will be the long-term impact on herd health? A thoroughly and carefully conceived plan will likely produce a more desirable outcome than an easy fix, the consequences of which do not appear to have been adequately considered.

Corr. ID: 936**Organization:** *Not Specified***Comment ID:** 93216**Organization Type:** Unaffiliated Individual

Representative Quote: There would be a preference for removing does because this would reduce the population level more efficiently over the long term. During the first three years of treatment, both does and antlered deer (bucks) would be removed based on opportunity. Buck-only removal would not control population growth; however, as deer populations are largely dependent on the number of does with potential for reproduction. Harvest of does is necessary to stabilize or reduce populations. Records would be kept on the age and gender of all deer removed from the park to aid in defining the local population composition. This information would be compared with data used in population models to improve model accuracy.

"How would genetic preference be taken into consideration? Obviously genetics play a major factor on all reproduction and endurance of a species; especially since the plan is also to, "develop a deer management strategy that supports protection, preservation, and restoration of native vegetation and other natural (including the whitetails) and cultural resources throughout and beyond the life of this plan/EIS.

Corr. ID: 936**Organization:** *Not Specified***Comment ID:** 93217**Organization Type:** Unaffiliated Individual

Representative Quote: A healthy heard would be more resistant to CWD and act as a better preservation of the white-tailed deer natural resource. How have genetics been addressed if a culling method is employed?

Corr. ID: 1141**Organization:** *Not Specified***Comment ID:** 92959**Organization Type:** Unaffiliated Individual

Representative Quote: One thing you must consider is the age of these deer. Experience has shown us these deer in the overpopulated areas are not all young. While you may find only a few bucks 3+ years of age, it is very common to find many does three-to-six-years-old and many over ten years of age. Elimination of a portion of these older deer is the key to developing a permanent plan for deer management.

RESPONSE:

Gender preference associated with implementation of lethal (sharpshooting) and non-lethal (reproductive control) actions are described on pages 2-29 and 2-39 of the plan/EIS. Removal or treatment (with a fertility control agent) of female deer is necessary to achieve reduction or stabilization of deer populations. Deer population reduction and/or maintenance is the desired outcome of implementing both lethal (sharpshooting) and non-lethal (reproductive control) actions. Therefore, gender is the primary selection factor determining which deer in the population are removed or treated with a fertility control agent. As described on page 2-42, due to the size of the deer population, during the first two years of sharpshooting, both female and male deer across age classes would be removed based on availability/ opportunity. Thereafter, at least 15 does should be taken for every 10 bucks.

NPS *Management Policies 2006*, Section 4.4.1.2, states that when native animals are removed for any reason, such as culling, to reduce unnatural population conditions resulting from human activities the Service would maintain the appropriate levels of natural genetic diversity. Current technology does not allow for evaluation of genetic make-up based on visual estimation, nor is there a body of literature related to what genes would be selected for or against in white-tailed deer. Therefore, genetics as a selection factor in determining in the field which individual deer would be removed or treated with a fertility control agent would not be a consideration. As described on page 2-39 of the plan/EIS, deer would be removed in proportion to their availability during the first two years of sharpshooting and this action would occur parkwide. The ability of deer to immigrate into the park would continue to promote gene flow with surrounding deer populations. This removal strategy would be expected to be sufficient to maintain existing levels of natural genetic diversity (see pages 4-35 of the plan/EIS).

Darimont et al. (2009) considered twenty-nine species (only two were ungulates or even vertebrates) in a meta-analysis of phenotypic (and therefore implied genotypic) change resulting from recreational or commercial removal of organisms from their environment. They suggest recreational and commercial exploitation result in phenotypic selection, stating human predators select directly on the phenotypes (visual expression of genotype such as coat color) of populations and often adjust their effort in ways that maintain consistent strength and form of selection over time. In other words, when organisms are removed from the environment under a scenario of commercial or recreational use, humans often select for one or more particular traits. For example, they may select for the largest body size, largest antler size, or some other preferred trait. This puts selective pressure on the population, which results in relatively rapid evolution of the species. They suggest that this evolutionary change is much faster than would be expected in a natural system, and could be deleterious to a population. Deer removal under Alternatives C or D of the plan/EIS is neither commercial nor recreational in nature. As described on page 2-39, due to the size of the deer population, during the first two years of sharpshooting, both female and male deer across age classes would be removed based on availability/opportunity. Thereafter, at least 15 does should be taken for every 10 bucks. Phenotypic considerations would not be used as a selection factor in determining which individual deer would be removed or treated with a fertility control agent. Therefore, this study is not considered directly relevant to deer management at the park.

CONCERN ID:

19899

**CONCERN
STATEMENT:**

Commenters questioned what would happen to the meat after lethal removal actions. Many stated that the meat should be donated in some fashion.

**REPRESENTATIVE
QUOTE(S):****Corr. ID:** 9**Organization:** *Not Specified***Comment ID:** 91860 **Organization Type:** Unaffiliated Individual

Representative Quote: Another option to consider is having all meat from the deer harvested donated to food banks and soup kitchens which are hit hard right now due to the economy. Donations are way down since people are having trouble making ends meet. There is also an influx of people needing that assistance at this time. This would ensure that none of the harvested deer go to waste and help feed the hungry.

Corr. ID: 560**Organization:** *Not Specified***Comment ID:** 91927 **Organization Type:** Unaffiliated Individual

Representative Quote: For deer that end up being killed, can they be used as food? It seems like a waste to kill them and bury them when they could be used to feed the hungry or could be delicacies in restaurants.

Corr. ID: 585**Organization:** *Not Specified***Comment ID:** 91990 **Organization Type:** Unaffiliated Individual

Representative Quote: What is going to happen to the deer meat? Perhaps a "Hunters against Hunger" Program should be considered. www.wildlifedepartment.com

Corr. ID: 942**Organization:** *Not Specified***Comment ID:** 92877 **Organization Type:** Unaffiliated Individual

Representative Quote: I think that the plan is a good one I would just like to suggest that these deer be processed and turned into food that would be used at shelters, food pantries, etc to feed our hungry and underserved populations. Perhaps a trade (Meat) for service would work to get processors to help out.

Corr. ID: 1110**Organization:** *Not Specified***Comment ID:** 92752 **Organization Type:** Unaffiliated Individual

Representative Quote: I did not see it stated in the article as to how the dead deer would be handled. If you stated that by giving the deer to the homeless shelters and the old folks home (as I believe as done with the road kill years ago) it would lessen some tax money and therefore be beneficial to the residents of the state and USA.

RESPONSE:

Under both Alternatives C and D (preferred alternative) it is the park's intention to donate as much harvested meat as possible to local food banks or food pantries for the purpose of redistribution for human consumption (See page 2-37). Should CWD occur within 60 miles of the park boundary or the park fall within a state-established CWD containment zone, then carcass disposal would occur in accordance with NPS Public Health Program guidelines for meat from an "Area Affected by CWD" and the Pennsylvania Chronic Wasting Disease Response Plan (see pages 2-14 through 2-23).

AL4360 - Alternatives: Reproductive Control of Does**CONCERN ID:**

19692

**CONCERN
STATEMENT:**

Commenters stated that the plan/DEIS does not provide a sufficient explanation on how the park would monitor the status of ongoing reproductive control research, adding that the NPS should evaluate new wildlife contraception literature at least yearly to stay current with the latest research. Other commenters stated that the data used to analyze the impacts of PZP is out-dated, that more research on the use of reproductive control agents is necessary, that the criteria used to analyze the appropriateness of the various reproductive control agents may be biased considering reproductive control agents have been used in other National Park units, and questioned if CWD was considered in the decision to use reproductive control.

**REPRESENTATIVE
QUOTE(S):****Corr. ID:** 1096**Organization:** *Not Specified*

Comment ID: 93526 **Organization Type:** Unaffiliated Individual

Representative Quote: With CWD in the equation, does it impact the decision to use reproductive control?

Corr. ID: 1108 **Organization:** Animal Welfare Institute

Comment ID: 93783 **Organization Type:** Conservation/Preservation

Representative Quote: The NPS has relied on these criteria to contend that there is no non-lethal reproductive control product that can meet these standards at this time and, therefore, any potential use of such controls has to be deferred to a later date. This contention is simply wrong and, again, demonstrates a bias within the NPS against any management option other than using lethal control. It is important to note that the Draft EIS makes clear that any non-lethal reproductive agent option does not have to precisely meet each of these criteria.

Moreover, the origin of these criteria is not disclosed. Considering that the NPS has elected to utilize contraceptive agents in horses (Assateague Island National Seashore), deer (Fire Island National Seashore), and Tule Elk (Point Reyes National Seashore), these criteria must have been developed specific for VFNHP. This raises concerns of potential bias in crafting these criteria as mentioned previously.

Corr. ID: 1108 **Organization:** Animal Welfare Institute

Comment ID: 93787 **Organization Type:** Conservation/Preservation

Representative Quote: Finally, the NPS claims that it "would monitor the status of ongoing reproductive control research," Draft EIS at 2-29, but it provide no explanation of how this would be done, how frequently the literature would be reviewed, and how the NPS would announce its decision regarding the use of non-lethal reproductive control options. Even if, for the same of argument, the NPS has correctly determined that none of the currently available vaccines or agent meet its stated criteria, research on these agents is being conducted fast and furious. At a minimum the NPS must, therefore, specify that it will evaluate the new wildlife contraception literature at least yearly and will publish a summary of those new developments along with a new decision regarding the use of non-lethal reproduction control in VFNHP each year.

Corr. ID: 1131 **Organization:** Cummings School of Veterinary Medicine, Tufts University

Comment ID: 93255 **Organization Type:** University/Professional Society

Representative Quote: At 4-22, the DEIS refers to a "population model developed for the park in 2008" which "estimates that the time required for the population to be reduced to the deer density goal would be approximately 18-19 years," and refers the reader to Chapter 2 for a description of the model. I was unable to find any such model described in Chapter 2 or anywhere else in the DEIS. However, a population model with plausible, site-specific assumptions could and should be developed to seriously evaluate the likely effects of PZP treatments on population size. Such a model ought to incorporate the use of current multi-year, single-shot vaccines, which might well produce more rapid decreases than previous efforts (Rutberg and Naugle 2008b, Turner et al. 2008).

RESPONSE:

As described on page 2-31 of the plan/EIS, the park would monitor the status of ongoing reproductive control research on a periodic basis through consultation with subject matter experts and review of new publications in the literature. When advances in technology could benefit deer management in the park and established criteria were met, the final choice of an appropriate chemical reproductive control agent would be determined. The NPS considers this approach to be sufficient for remaining current on this subject.

In January 2009, the NPS requested an independent review of Appendix E Review of White-tailed Deer Reproductive Control from two respected researchers in the field of wildlife reproduction and contraception. These comments have been provided in the NPS

Public Comment Analysis Report (2009) for the plan/EIS and reviewers are identified in Section 5.4.2 List of Recipients. NPS staff also conducted an updated literature review including information related to the implementation of reproductive control in other NPS units. Appendix E Review of White-tailed Deer Reproductive Control has been updated to reflect recent publications in the literature, to address comments by reviewers, and to provide a more detailed explanation of criteria for an acceptable reproductive control agent and how various agents met or did not meet the criteria.

As stated on page 2-29 of the plan/EIS, only when established criteria are met would reproductive control be implemented as a management tool. Criteria for an acceptable reproductive control agent were considered necessary because review of the literature across the broad array of immunological and nonimmunological reproductive control agents indicated significant variation in key elements such as duration of contraceptive effect and behavioral impacts as well as logistical issues related to the administration of these drugs that could have significant implications related to the success of implementation and sustainability of a reproductive control program. NPS considers the established criteria for an acceptable reproductive control agent, specific to Valley Forge NHP, to be a necessary tool in selecting an agent that would minimize impacts to deer and other park resources and ensure program success and sustainability. This is particularly important when considering a tool proposed for use in long-term management.

Fertility control agents have primarily been used in NPS units within a research context (e.g., Fire Island National Seashore and Point Reyes National Seashore). Research proposals are reviewed by individual park units and evaluated based on their scientific validity, researcher and institutional qualifications, benefit to the park service and the public, actual or potential impacts to park resources, visitor experiences, wilderness, safety, and other issues. NPS units using fertility control agents within a long-term management context have often been previously involved with the agent within a research context to correctly understand the effects of a particular agent on the target species. For example, Assateague Island National Seashore has used immunocontraceptives to manage horse populations since 1994. However, the selected reproductive control agent was researched for nine years prior to that (1985-1993), in an effort to determine whether it would be safe and effective in controlling/reducing horse populations as directed in the 1985 Feral Pony Management Plan. Criteria for determining what represents an acceptable reproductive control agent to be applied in a long-term management context may be very different from how an acceptable agent may be evaluated within a research context.

A description of the population model developed by Dr. Christopher Rosenberry (PGC Deer Management Section Supervisor) to determine the number of deer to be removed and/or treated with a reproductive control agent under alternatives B, C and D is described on page 2-38 of the plan/EIS.

CONCERN ID: 19693

CONCERN STATEMENT: Commenters discussed the various side effects that some reproductive control agents have on the targeted animal, including prolonging the lifespan of the targeted animal, and abnormal antler development and stated that these needed to be considered in the plan/DEIS.

REPRESENTATIVE QUOTE(S): **Corr. ID:** 506

Organization: Friends of Animals, Inc.

Comment ID: 93339

Organization Type: Conservation/Preservation

Representative Quote: Currently, no contraceptive has been formally approved by the Food and Drug Administration for use on free-living animals in the United States; various contraceptives have, however, been tested on deer, and proponents of this form of control call it an effective way to alter sexual activity and reproductive patterns of deer. For years, the development of this concept has involved experiments with porcine zona pellucida and gonadotropin-releasing hormone on captive white-tailed deer at

Pennsylvania State University. In the male deer, results included "immunological castration, compromised libido and abnormal antler development." Abscesses, inflammation, pain, and reduced fat content in bone marrow are some of the side effects observed in other studies.

Controlling the fertility of free-ranging animals is physically intrusive and can alter the social structure of the entire group. It is also misguided. It prevents future generations from appearing in targeted areas, even as our own species spreads out ever further with our roads, malls, and mansions.

Corr. ID: 506

Organization: Friends of Animals, Inc.

Comment ID: 93341

Organization Type: Conservation/Preservation

Representative Quote: It's illogical that local environmentalists would adamantly promote the reduction of deer population in the name of saving birds, yet have little to say about the introduction of contraceptive substances into the environment and into the natural food web. Moreover, to use the park's deer experimentally (at the time the alternatives were issued, and at the time of this writing, fertility control can only be considered experimental) makes no sense. Experimental fertility control has prolonged the six-year lifespans of the Assateague Island mares to 20 years due to eliminating the biological stress of reproduction. To artificially prolong animals' lives does not reduce their numbers and thus it contradicts the Valley Forge biologists' stated preference.

RESPONSE:

Appendix E: Review of White-tailed Deer Reproductive Control has been updated in the plan/EIS to reflect recent publications in the literature, to address comments by outside reviewers (including side effects), and to provide a more detailed explanation of criteria for an acceptable reproductive control agent and how various agents met or did not meet the criteria.

The plan/EIS, including Appendix E, does not contain any discussion of the impacts of fertility control agents on male deer (e.g., abnormal antler development) because Alternatives B and D clearly state that only female deer would be targeted for treatment. See response to AL4180 – Alternatives: Lethal Reduction – General, Concern ID 19691 (page F-49) regarding gender preference.

CONCERN ID:

19695

CONCERN STATEMENT:

Some commenters questioned, and disagreed with, the analysis used in the plan/DEIS regarding reproductive control agents, specifically whether PZP can be administered remotely, whether reproductive vaccine components pose a human health risk, and why behavioral studies are analyzed for reproductive control actions but not lethal actions. Some commenters were concerned about the possibility of utilizing reproductive control agents in the park when the research regarding effects to the animals, as well as effects to humans and the natural environment, are still ongoing.

REPRESENTATIVE QUOTE(S):

Corr. ID: 874

Organization: *Not Specified*

Comment ID: 92934

Organization Type: Unaffiliated Individual

Representative Quote: I appreciate the opportunity to comment on the White-Tailed Deer Management Plan which I found to be fairly comprehensive with one major exception. The section dealing with reproductive control is based on long out-dated information despite the fact that scientific data and publications have been provided to VHNHP proving the success with PZP immunocontraception in field situations in multiple species worldwide. In fact, the National Park Service has successfully used PZP immunocontraception in White-Tailed Deer for long term management in other parks.

Corr. ID: 950

Organization: *Not Specified*

Comment ID: 93267

Organization Type: Unaffiliated Individual

Representative Quote: I also have concerns that the contraceptives may have negative

secondary impacts on our environment. For example: What will the side effects be on the wildlife that feed off of the carcasses of chemically altered deer? How will the chemicals impact the bodily waste of the deer and how would this affect the land and water run-off?

Corr. ID: 978

Organization: The Humane Society of the United States

Comment ID: 93130

Organization Type: Conservation/Preservation

Representative Quote: In the interim, with all due respect, we disagree with the blanket claim about the "status of chemical reproductive agents" since the chemical agent known as Porcine Zona Pellucida (or PZP) meets all but one of the listed criteria, has been shown to effectively reduce fertility in white-tailed deer, and has been associated with population reductions of 7.9% on average over the course of an 8 year study at the National Institute of Standards and Technology, Maryland, with similar results from Fire Island National Seashore, New York. This technique was originally developed for use on wild horses at Assateague Island National Seashore, Maryland, and is also currently in use for wild horse management at Cape Lookout National Seashore, North Carolina.

The PZP vaccines used at these other NPS sites require annual boosters to be effective, but significant progress has been made since 2002 on long-acting single shot PZP vaccines. The effects of the vaccine are reversible after three years of treatment, and no adverse health effects have been apparent among treated deer or among fawns they carried at the time of treatment.

Furthermore, on October 22, 2002, the HSUS submitted a proposal to Valley Forge National Historical Park to conduct research on the efficacy of PZP on deer in the park. The proposal was rejected on the grounds that the park did not have any plans to manage its deer populations. Now that the park has decided to implement a deer management program, we hope that you will reconsider our offer to conduct immunocontraception research at Valley Forge. The site is an ideal area for the use of immunocontraception due to its high density of deer, the documented site fidelity of females, and the approachability of individual animals for treatment. Please consider these comments a reaffirmation of The HSUS' willingness to work with the Park to establish an immunocontraception research site at the Park. A copy of the original 2002 proposal has been included with these comments for your reference; any new proposal would be submitted only after extensive consultation with VFNHP.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93785

Organization Type: Conservation/Preservation

Representative Quote: For example, the PZP Vaccine and the GnRH Vaccine both are effective for up to two years satisfying the first criteria that the agent have multiple year efficacy. Both vaccine can also be delivery remotes in darts and, likely, in the form of biobullets thereby meeting the second criteria. According to the information in Table E-1 neither the PZP Vaccine nor the GnRH vaccine leave any hormonal residues in the meat thereby meeting the third criteria. In regard to the fourth criteria, the NPS claims that the PZP Vaccine may result in repeated cycling of female deer potentially leading to out-of-season breeding, Draft EIS at 4-33, Table E-1, while the only identified behavior consequence relevant to the GnRH vaccine is the possibility that the vaccine may remove primary and secondary sexual characteristics.

Corr. ID: 1130

Organization: The Science and Conservation Center

Comment ID: 93606

Organization Type: Conservation/Preservation

Representative Quote: Additionally, at this time, PZP vaccines require periodic boosters in order to maintain infertility, which requires hands-on access on a moderately regular basis.

NOT TRUE. THIS VACCINE WAS SPECIFICALLY CHOSEN BECAUSE IT CAN (AND HAS AND IS) BEEN DELIVERED REMOTELY WITHOUT ANY HANDS-ON.

Corr. ID: 1130**Organization:** The Science and Conservation Center**Comment ID:** 93607**Organization Type:** Conservation/Preservation

Representative Quote: Finally, the Food and Drug Administration (FDA), the current regulatory agency, has not determined whether vaccine components pose a human health risk.

THERE ARE TWO PROBLEMS WITH THIS ASSESSMENT. FIRST, NO ONE AT FDA OR ANYWHERE ELSE FOR THAT MATTER CAN SITE A SINGLE INCIDENCE OF A 55,000 MW PROTEIN MOLECULE PASSING THROUGH THE DIGESTIVE SYSTEM OF ANY SPECIES AND RETAINING ITS PRIMARY, SECONDARY OR TERTIARY STRUCTURE AND SUBSEQUENT BIOLOGICAL ACTIVITY. THAT FAILURE IS BECAUSE THIS IS AN AXIOM OF FUNDAMENTAL CHEMISTRY. THE FDA APPROVED BOVINE GROWTH HORMONE FOR USE IN CONSUMABLE ANIMALS (MONSANTO) AND THAT MOLECULE IS MUCH SMALLER AND LESS COMPLEX THAN PZP. THIRD, EARLY EXPERIMENTS, YEARS AGO, BY THE USDA SHOWED THAT PZP COULD NOT BE FED TO DEER AND RETAIN ANY ABILITIES TO RAISE ANTIBODIES. FOURTH, VIRTUALLY ALL OF THE USDA APPROVED VACCINES FOR FOOD ANIMALS ARE FAR MORE DANGEROUS, UTILIZING ATTENUATED OR KILLED PATHOGENS. THE ASSESSMENT ABOVE, TO WHICH I REFER, HAS NO SCIENTIFIC UNDERPINNING. I GUESS THE MOST TELLING CRITICISM HERE CAN BE BEST EXPRESSED WITH A QUESTION: WHY, IF PZP COULD PASS THROUGH THE FOOD CHAIN, WOULD WE LABOR TO DART ANIMALS RATHER THAN JUST FEED IT TO THEM? THE ANSWER IS, WE CAN'T JUST FEED IT TO THEM BECAUSE IT WON'T WORK.

Corr. ID: 1130**Organization:** The Science and Conservation Center**Comment ID:** 93612**Organization Type:** Conservation/Preservation

Representative Quote: HAS ANYONE CONDUCTED BEHAVIORAL STUDIES OF CULLED DEER POPULATIONS? WHY NOT? WHY IS THIS ONLY AN ISSUE WITH CONTRACEPTIVES? THE WHOLE BEHAVIORAL ISSUE IS HYPOCRITICAL. IN ORDER FOR ANY MANAGER TO ASSESS HIS TOOLS, IF THIS IS AN IMPORTANT QUESTION, HE/SHE MUST APPLY THESE SAME QUESTIONS AND SOME FORM OF TESTING TO ALL ALTERNATIVE MANAGEMENT STRATEGIES. (SEE KIRKPATRICK 2007. MEASURING THE EFFECTS OF WILDLIFE CONTRACEPTION: THE ARGUMENT FOR COMPARING APPLES WITH ORANGES. . REPROD. FERT. DEV. 19:548-552. WHICH SOMEHOW DIDN'T MAKE IT INTO THE LITERATURE REVIEW EITHER!). SOMEHOW I AM NOT SURPRISED. BLM IS VERY CONCERNED ABOUT THE BEHAVIORAL EFFECTS OF CONTRACEPTION ON ITS WILD HORSES (PUBLISHED STUDIES HAVE SHOWN THERE ARE NONE) BUT WON'T EVEN ALLOW STUDIES ON THE BEHAVIORAL EFFECTS OF GATHERS AND REMOVALS.

Corr. ID: 1131**Organization:** Cummings School of Veterinary Medicine, Tufts University**Comment ID:** 93253**Organization Type:** University/Professional Society

Representative Quote: Although fertility control may or may not ultimately serve to achieve VFNHP's deer management objectives, the treatment of the subject in the DEIS is unfairly slanted against the technology. Most egregiously, the DEIS misapplies theoretical models to predict the level of effort needed to achieve population-level effects and the magnitude of those projected effects, while ignoring published empirical data on the subject. This omission (which occurs at 2-30, 4-21, E-6, and elsewhere) is especially perplexing to me because the DEIS cites in other contexts some of the very papers that contain data on the population effects of PZP (Naugle et al. 2002, Rutberg et al. 2004). Additional data on the population impacts of PZP are provided in more recent papers that are not cited (Rutberg and Naugle 2008a, Rutberg and Naugle 2008b).

In both field studies whose results are reported in these papers, observed population effects are more dramatic than those hypothesized in the DEIS. As the DEIS indicates, the rapidity of population decreases depends on vaccine effectiveness, proportion of females treated, mortality rates, reproductive rates in untreated animals, immigration, and emigration. The population projections and effort requirements that are presented in the DEIS are wrong because their estimates of fertility of untreated animals are higher and estimates of mortality lower than found in existing data, including those for VFNHP. The annual population growth rate reported in the DEIS for VFNHP, for example, falls far short of the 1.49 assumed in the models of Hobbs et al. (Hobbs et al. 2000).

Corr. ID: 1141

Organization: *Not Specified*

Comment ID: 92961

Organization Type: Unaffiliated Individual

Representative Quote: I am extremely concerned about proposing and relying on unproven and perhaps unavailable fertility control methods. Since we still do not know what all the negative effects the chemicals will have on the deer - i.e. continuous estrus, tainting the meat for hunters hunting on adjacent private lands, no commercially approved products (other than experimental the last time I investigated this), unproven reliability in an open population, expensive application procedures, etc. - I believe that offering this option as a viable alternative is an expensive waste of money and merely promotes unscientific emotional policy that simply does not work at this point.

RESPONSE:

The plan/EIS, (Section 2.6.1 Additional Actions Proposed Under Alternative B), including Appendix E: Review of White-tailed Deer Reproductive Control, has been updated to reflect recent publications in the literature, to address comments by outside reviewers and to provide a more detailed explanation of criteria for an acceptable reproductive control agent and how various agents met or did not meet the criteria.

The impacts of the alternatives on white-tailed deer, including deer behavior are fully evaluated and described in Chapter 4: Environmental Consequences. Impacts specifically associated with lethal reduction are described on pages 4-34 through 4-38. The evaluation of behavioral impacts associated with use of a reproductive control agent represents changes in the behavior of individual treated deer that cumulatively represent behavioral changes at the population-level. The same evaluation of impacts is not relevant to the analysis of sharpshooting, since treated deer under this scenario are lethally removed from the population. However, the impact of lethal and non-lethal activities (e.g., discharge of firearms, maintaining bait piles, traveling to and from bait sites) on the behavior of deer was fully analyzed and is described for all alternatives.

Statements in the plan/EIS regarding the magnitude of population decline related to the use of reproductive control agents have been updated to reflect estimates of change based on the population model used in plan development rather than based on population models reported in the literature. After five years of treatment with a fertility control agent (treating 90% of the female population), the park population model suggests that a population reduction of up to 33% could be expected. After ten years, a reduction in population of up to 60% could be expected (see page 2-32). However, statements relating to the total time to achieve the desired deer density (18-19 years) remain unchanged in the plan/EIS, consistent with the park population model (e.g., page 4-20 - 4-21).

AL4380 - Alternatives: Rotational Fencing

CONCERN ID: 19697

CONCERN

STATEMENT:

One commenter noted that there are already other fences within the park that can be seen by park visitors. Other commenters stated fencing associated with NPS long-term monitoring plots does not and proposed fencing would not prove that deer are exclusively responsible for the destruction of the vegetation.

**REPRESENTATIVE
QUOTE(S):****Corr. ID:** 56**Organization:** *Not Specified***Comment ID:** 93625**Organization Type:** Unaffiliated Individual

Representative Quote: It is important to keep in mind that ecosystems are extremely intricate mechanisms and there are many possible reasons for loss of biodiversity. One of your examples point to the study of specific fenced-in areas within the park built around vegetation to exclude deer. According to this study, the cordoned off vegetation quickly regenerates, however, what the study does not indicate is that deer are by no means the only animals that eat vegetation, and the fenced area keeps out ALL wildlife.

Corr. ID: 550**Organization:** *Not Specified***Comment ID:** 91890**Organization Type:** Unaffiliated Individual

Representative Quote: Building fencing @ vegetation, which subsequently regenerates, does not prove deer browsing destroyed the previous site. When exclosures are built around plants it keeps all wildlife out, not simply deer.

Corr. ID: 936**Organization:** *Not Specified***Comment ID:** 93199**Organization Type:** Unaffiliated Individual

Representative Quote: It is stated that, "The installation of any fencing could create visual impacts in the park and also prevent visitors from accessing certain areas."
"Are there not currently areas that are "fenced" due to the dumping of asbestos within the park? Which is worse for a VFNHP visitor to view, an unobtrusive fence that mentions the protection of vegetation or one that calls out, "KEEP OUT - Hazardous Waste Area."?"

RESPONSE:

A description of other factors affecting plant communities and tree regeneration is provided in Section 1.5.4 of the plan/EIS, including invasive non-native plants, pests and disease, forest fragmentation, and fire. Refer also to response to Concern ID 19747 (page F-23).

As described on page 2-23, "rotational fencing proposed under Alternative B would be a minimum of 8-10 feet high and would consist of woven wire with 3- to 4-inch openings to allow most small animals to move freely through the fence." Animals that cannot move freely through the fence, such as raccoons or opossums, would be able to climb over this fence. Fencing used for NPS long-term monitoring plots also allows most small animals to move freely through or over the fence. The plan/EIS has been updated to include this fact on page 3-10.

Fencing is used on a small scale, temporary basis throughout the park as needed to protect plants (e.g., riparian buffer fencing, newly planted trees) and promote public safety. Fencing around the Asbestos Release Site, referred to by the commenter, is only four feet in height and composed of only two strands of brown plastic fencing. In many locations actual fencing is absent but posts with signs advise visitors that the area is closed due to hazardous waste. This fencing is considered critical to the protection of public health and safety and would be removed upon remediation of the site. Fencing as described under Alternative B would be "woven wire, 8-10 feet in height, covering 10% to 15% of the park's forested habitat including significant archeological and cultural sites" is considered to be at a much larger scale and impacting significantly more of the park landscape than current fencing within the park.

AL5600 - Alternatives: Alternative C - Combined Lethal Actions**CONCERN ID:**

19704

**CONCERN
STATEMENT:**

Commenters were confused by the impact analysis of alternative C and D, stating that they are both extremely similar, and that the impact analysis associated with alternative C is contradictory within the plan/DEIS. One commenter stated the selection of Alternative D as the NPS Preferred Alternative needed clarification and asked why alternative D would cost twice as much as alternative C if they are equally efficient.

**REPRESENTATIVE
QUOTE(S):****Corr. ID:** 1108**Organization:** Animal Welfare Institute**Comment ID:** 93753**Organization Type:** Conservation/Preservation

Representative Quote: Alternatives C and D, for example, both call for a significant slaughter of deer to reduce the deer density from the estimated 193 deer per square mile to 31-35 deer per square mile (with the possibility of reducing the population to 10 deer per square mile if CWD is detected in or near the park). Draft EIS at viii. The only difference between these alternatives is the Alternative C relies on lethal action to maintain deer numbers while Alternative D would rely on non-lethal reproductive control (if successful) to maintain post-slaughter deer numbers. Since the methods employed to reduce the deer population (i.e., sharpshooting and capture and euthanasia) are the same and the impacts of the slaughter are the same for Alternatives C and D, they are effectively a single alternative.

Corr. ID: 1108**Organization:** Animal Welfare Institute**Comment ID:** 93809**Organization Type:** Conservation/Preservation

Representative Quote: Another error in the Draft EIS is made on pages 4-46 and 4-47. First the NPS states that "when added to the impacts of Alternative C, the overall cumulative impacts would likely remain long-term and adverse." Draft EIS at 4-46. Yet, on the next page, the NPS states that "these projects, along with Alternative C would result in a long-term beneficial cumulative impact on other wildlife and wildlife habitat." Draft EIS at 4-47. The cumulative impact of Alternative C cannot be both long-term and adverse and long-term and beneficial. This needs to be corrected

Corr. ID: 1109**Organization:** Pennsylvania Game Commission**Comment ID:** 93002**Organization Type:** State Government

Representative Quote: Selection of alternative D as preferred to C is confusing. The plan initially indicates that alternative C is the most efficient, but then unclearly explains how D becomes as efficient as C (page 2-56). However, if both C & D achieve the same goal, how can D be as efficient as C if it costs twice as much (page 2-63). If some other factor makes D more appealing, it needs to be more clearly stated.

RESPONSE:

In many cases, as stated by one commenter, the impact analysis for Alternatives C and D is very similar. As described in Chapter 2, Alternative C proposes lethal methods to both reduce the size of the deer population and to maintain it at the desired deer density. In contrast, Alternative D proposes lethal methods to reduce deer population size but nonlethal methods (chemical reproductive control) to maintain the population at the desired deer density. Selection of the NPS Preferred alternative was based on ability to meet the individual plan objectives and the potential impacts on the environment. Alternatives C and D were closely ranked in their ability to meet all of the objectives. However, under Alternative D, the time that shooting would occur in the park would be limited to population reduction actions. By maintaining the efficiency of Alternative C in meeting the plan objectives and improving safety by reducing the time that sharpshooting activities would occur in the park, Alternative D proved to be the preferred alternative. Section 2.13: NPS Preferred Alternative has been updated to clarify this information.

With respect to impact analysis, alternative actions can result in both adverse and beneficial impacts. Using the example from the representative quote, the commenter is quoting text related to cumulative impacts associated with a cumulative action (climate change = long-term and adverse) and the overall cumulative impact (long-term and beneficial). The overall cumulative impact has been clarified throughout the plan/EIS, where appropriate, to note the long-term, minor, adverse and long-term beneficial cumulative impacts. (See impact analysis for Vegetation and Special Status Plant Species and Other Wildlife, Wildlife Habitat, and Special Status Animal Species.)

As indicated in Appendix D: Detailed Cost Estimates of the plan/EIS, the annual cost under Alternative D to implement reproductive control is significantly greater than annual costs associated with the use of lethal methods to maintain the desired deer

density as proposed under Alternative C. Please refer to tables D-3 (page D-9) and D-4 (page D-12) for detailed information on costs to implement Alternatives C and D.

AL7000 - Alternatives: Cost and Funding (General)

CONCERN ID: 19711

CONCERN STATEMENT: Commenters questioned the cost analysis regarding implementing reproductive control measures, stating that the estimates are too high.

REPRESENTATIVE QUOTE(S):

Corr. ID: 946 **Organization:** *Not Specified*

Comment ID: 93114 **Organization Type:** Unaffiliated Individual

Representative Quote: I believe birth control for deer is the best plan. I think the estimated cost of implementing Plan B is inflated and that the commission has established some arbitrary criteria for accepting a birth control drug in order to make this option seem less viable. I would, however, also support Plan A and allow natural fertility cycles stabilize the existing population.

Corr. ID: 961 **Organization:** *Not Specified*

Comment ID: 93082 **Organization Type:** Unaffiliated Individual

Representative Quote: The treatment in the draft plan of contraception is very inadequate and misleading. To take only one example, the report states that "the expected costs for implementing reproductive controls range from \$1,000 to \$1,900 per deer (D-4) while sharpshooting costs, according to various studies range from \$71 -\$260 according to one study, \$121 according to another, \$128 according to another while still another study from the National Park Service itself showed it cost \$400 per deer." The draft concludes that "It is estimated that this alternative [sharpshooting] would cost \$200 per deer for the first four years and would increase to \$400 per deer as the population decreased and deer became more wary of human activities. However, with a smaller population even though the cost per deer might increase because of the additional time needed to locate deer, the overall removal costs could decrease, because fewer deer would have to be removed:" (D-7) The higher estimate by the Park Service corresponds more closely with information published in the 2002 Wildlife Society Bulletin (Beringer et al, 30:7657) that gives the sharpshooting cost per deer as \$354. On the other hand, the use of a contraceptive such as PZP would save taxpayers money and thin the herd effectively. PZP has been researched for a number of years and has an extensive history of publication that you have largely ignored. It costs between \$21 and \$25. Darting has taken approximately 1.8 hours (less than 2 hours) per deer even in difficult circumstances (not 20 hours). Simple arithmetic will show that the hourly pay rate of someone darting deer would have to be very high to equal even the \$200 estimate of sharpshooting.

Corr. ID: 1017 **Organization:** *Not Specified*

Comment ID: 92462 **Organization Type:** Unaffiliated Individual

Representative Quote: 1. The plan significantly understates the potential of immunocontraception to reduce the population density in a timely and affordable fashion.

At a mere \$21 per dose, the porcine zona pellucida (PZP) vaccine has been proven to effectively reduce free-ranging, suburban white-tailed deer populations like those at Valley Forge. On Fire Island, a 30-mile long stretch of land just off the coast of New York, PZP reduced the overall deer population density by nearly 60% between the years of 1996 and 2006. Studies carried out at the National Institute of Standards and Technology (NIST) in Gaithersburg, Maryland yielded similarly positive results, with a reduction of 50% between the years of 1997 and 2005. These findings are a far cry from the unfounded suggestion that injecting 460 does at Valley Forge would only produce a population reduction of 5% after several years.

The actual cost of PZP is also a far cry from the estimated \$1000-\$1900 per deer quoted

in Appendix D. Even with labor costs factored in, the expense incurred per deer on Fire Island did not exceed \$66 in the first two years. This disparity is largely due to the misconception that the administration of PZP requires tranquilizing, trapping, and permanent tagging. In fact, dart guns were used on Fire Island to inject deer remotely and simultaneously mark the animals with brightly colored paintballs. These markings were only temporary, but they ensured that no deer was injected too many times. Given that PZP is not passed down through the food chain, humans can safely eat the meat of deer injected with the vaccine, and there's therefore no need for permanent tagging of treated deer.

Further financial considerations include the following:

" Trained volunteers can safely administer PZP for free.

" Independent, nonprofit organizations such as Pity Not Cruelty, Inc. would be willing to fund a significant part of any immunocontraception program in Pennsylvania, a state infamous for being trigger-happy towards its wildlife.

" On account of the compensatory rebound effect, (see below), fewer deer will ultimately need to be treated with immunocontraceptive vaccines than would otherwise have had to be shot under a lethal management program.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93813

Organization Type: Conservation/Preservation

Representative Quote: The NPS should amend its estimate of the cost of administering non-lethal reproductive controls to 460,000 to 920,000 dollars (see Draft EIS at 4-93) since the low per deer estimate is \$1,000 and the objective is to treat 460 deer per year. By citing only the larger figure the NPS is, again, attempting to dissuade the public from seriously considering and advocating for non-lethal reproductive control due to the costs. This claim is based solely on the cost per deer estimated in the Draft EIS. AWI is not suggesting that said estimate is correct. Indeed, even the NPS reports in the Draft EIS that the cost of administering non-lethal reproductive control treatments to deer has been documented to be as low as \$200 per deer with handling/processing costs not included. Draft EIS at D-4.

RESPONSE:

The NPS believes the cost range presented in the plan/EIS related to implementation of reproductive control is accurate and sufficiently justified. Explanation of costs presented in the plan/EIS is provided in Appendix D: Detailed Cost Estimates. The cost range of \$1,000-\$1,900 per deer to implement reproductive control is based on figures provided in referenced literature and through consultation with subject matter experts, as described in Appendix D, page D-4. The high range is based on an initial estimate provided by APHIS Wildlife Services, a government agency with extensive experience implementing actions described in the plan/EIS including administration of reproductive control agents. Costs are based on the administration of Leuprolide (\$200/dose) because this agent most closely met the established criteria for an acceptable reproductive control agent (See page 2-29 and D-4). As described on page D-4, cost per deer as presented in the plan/EIS includes not only the relatively minor cost of the fertility control agent but also the anesthetic agents, labor and equipment, and bait piles (as appropriate) which constitute the majority of the overall cost. Use of volunteers could potentially reduce costs associated with implementation of reproductive control depending on the circumstances (e.g., what activities volunteers were involved with). Additional details have been added to Section 2.5.1 Use of Volunteers and throughout the document as appropriate, to clarify how volunteers would be used to implement both lethal reduction and reproductive control and to provide general volunteer training requirements and/or qualifications. On page 2-14 of the plan/EIS, the NPS states that volunteers could be involved in activities related to the administration of reproductive agents under the direct supervision of NPS employees. Volunteers would not be permitted to fire dart rifles but may be involved in wildlife handling activities and the handling/transport of chemical agents if such volunteers meet required training standards.

Regarding the rate of population reduction associated with reproductive control, please refer to the response for Concern ID 19695 (page F-56).

Regarding the need for permanent marking of treated deer and temporary marking of deer at Fire Island National Seashore, please refer to Appendix E Review of White-tailed Deer Reproductive Control (Pages E-4 and E-5).

AE10010 - Affected Environment: Vegetation and Special Status Plant Species

CONCERN ID: 19654

CONCERN STATEMENT: Some commenters stated that the reduced understory vegetation growth is due to forest fragmentation, and not caused by the deer in the park and stated this was not captured in the plan/EIS. Similarly, another commenter stated that edge effect and human activities likely also contribute to the deteriorating vegetation within the park and is not considered in the plan/EIS.

REPRESENTATIVE QUOTE(S):

Corr. ID: 545 **Organization:** *Not Specified*

Comment ID: 91997 **Organization Type:** Unaffiliated Individual

Representative Quote: WE HAVE FRAGMENTATION WHICH AFFECTS THE GROWTH OF FOREST VEGETATION, IT DOES NOT GROW SO MUCH WHEN YOU FRAGMENT THE FOREST. ALL OF THESE INFLUENCES AND MANY OTHERS IS WHAT IS HAPPENING TO OUR FORESTS, NOT DEER.

Corr. ID: 978

Organization: The Humane Society of the United States

Comment ID: 93123

Organization Type: Conservation/Preservation

Representative Quote: The EIS fails to demonstrate what, if any, affect deer herbivory will have on forest health or any other feature of the VFNHP ecosystem.

Edge effects are well - known and their effects on plant species composition and diversity are well - documented. In fact, research in Pennsylvania and Delaware shows that the species composition of plants along forest edges is different than that found in interior forests. These effects may be observed well over 40 meters from the edge of the forest and after 50 years of succession on the edge. There has been no detailed analysis on the edge effects at VFNHP nor the influence of human land use practices on the existing forest habitat. Considering the high human population density in the areas near the Park and the presence of surrounding farmlands, it is safe to assume that edge effects are having a major impact on the vegetative communities in the park.

RESPONSE:

The NPS believes that the dominant role of white-tailed deer within ecological systems is recognized throughout the document including the analysis of impacts which is based on the fact that deer are the primary factor influencing native vegetation (and thus other wildlife and wildlife habitat). Regarding the role of deer as a keystone herbivore, please refer to response to Concern ID 19778 (page F-80).

A description of other factors affecting plant communities and tree regeneration is provided in Section 1.5.4 of the plan/EIS, including invasive non-native plants, pests and disease, and fire. A brief description of forest fragmentation as a factor influencing vegetation has been added to the plan/EIS in Section 1.5.4 Other Vegetation Management Issues. All forests at Valley Forge NHP are considered to be fragmented and, due to the importance of the current mix of field and forest as a feature of the cultural landscape, no significant loss or gain of forested land is expected to occur. "Edge effects" are already captured in existing vegetation descriptions presented in the plan/EIS (e.g., Modified Successional Forest or VAFO-Type described on page 3-2) and the results of long-term vegetation monitoring which include sites close to the forest edge (See Figure 3 for location of monitoring plots relative to forest edge).

Regarding the effects of deer herbivory on forest resources in the park, refer to response to Concern ID 19747 (page F-23).

Regarding human land use in the park in relation to park forests, refer to response to Concern ID 19903 (page F-64).

CONCERN ID: 19655

CONCERN STATEMENT: One commenter questioned whether the locations of the special status species have been identified, and if these locations will receive protection from the deer. Another commenter stated that because the park has chosen not to place protective fencing around various species of vegetation within park boundaries, it would appear that the park is not concerned about protecting these species from deer browsing, thus challenging the park's purpose of the plan.

REPRESENTATIVE QUOTE(S):

Corr. ID: 1089 **Organization:** *Not Specified*

Comment ID: 93560 **Organization Type:** Unaffiliated Individual

Representative Quote: Do we know where the special status species are, and how they are protected?

Will particular areas be targeted for deer to protect special status species?

Corr. ID: 1108 **Organization:** Animal Welfare Institute

Comment ID: 93771 **Organization Type:** Conservation/Preservation

Representative Quote: The information about the species in the park is interesting. See Draft EIS at 3-7. The single known population of possumhaw in the park is fenced and, therefore, is no longer threatened by deer browsing. The broadleaf ironweed is alleged known from one location in the park but its population will not be fenced until 2009. Why the NPS is delaying the protection of this population is unclear but suggests a lack of serious concern over the potential impacts of deer browsing. The sundial lupine is believed to be extirpated from the park (whether deer browsing caused this extirpation is unknown) and, therefore, is not relevant to the discussion in the Draft EIS. The netted chainfern has only recently been identified in the park and has yet to be fenced. Again, the delay in fencing this species is of concern given the alleged high susceptibility of this species to deer browsing. The toothcup may be removed from the state list because it may be more common than once thought. If so, it also should not be of concern in regard to deer management issues. The remaining species, bush bluestem, Elliott's broomsedge, and sand blackberry, though documented in the park, face less of a threat from deer browsing due to palatability issues and/or their location in the park environment. Draft EIS at 3-8.

RESPONSE: In 2008, the park completed a survey to determine whether plant species of special concern that historically occurred in the park are still present. Species documented as present are listed in Table 9 (page 3-7) and the locations where they were identified have been documented. The two plant species that are state-listed endangered (possumhaw viburnum and broadleaf ironweed) within the park have already been fenced to protect them from deer browse. The plan/EIS has been updated to reflect this fact. Please refer to Special Status Plant Species (pages 3-7 and 3-8).

Broadleaf ironweed was documented in the park at the end of the growing season in 2008. It was not fenced until spring 2009 because there was no need to provide protection during the fall and winter of 2008/2009 when vegetative portions of the plant were no longer visible and the ground was frozen.

CONCERN ID: 19903

CONCERN STATEMENT: Commenters questioned the EIS statements regarding quantity of flora and fauna species the park supports, given the size of the park and the population density of deer. They also stated that secondary forests (such as the park's) naturally contain less vegetation species diversity but that even under intense levels of herbivory they will attain a climax community similar in species composition to unbrowsed forests. One commenter states the plan/EIS must explain how deer herbivory will affect the health and continued survival of forests into the future.

**REPRESENTATIVE
QUOTE(S):****Corr. ID:** 978**Organization:** The Humane Society of the United States**Comment ID:** 93662**Organization Type:** Conservation/Preservation

Representative Quote: While it is true that white tailed deer consume plants and that this activity may affect some species more than others and result in community wide changes, any value judgment placed on these changes is by definition, purely subjective. The effects of herbivory are better interpreted in terms of vegetation state transition rather than on biased notions of perceived negative impacts. The reality of the supposed deleterious impacts of deer herbivory has not panned out in the long term.

Corr. ID: 978**Organization:** The Humane Society of the United States**Comment ID:** 93125**Organization Type:** Conservation/Preservation

Representative Quote: Another factor which is seldom considered when assessing the plant species composition in forests with deer herbivory is the successional status of that particular forest. Research has shown that plant species diversity is higher in primary forests than in secondary forests regardless of the herbivory regime. As the forest of VFNHP has been cleared in the past, it is secondary forest and, therefore, will not attain the levels of species diversity found in primary forests regardless of the herbivory regime.

Simulation models based upon field data have also shown that even at the most intense levels of deer herbivory, forest succession may slow down, but final forest composition is the same as would be found in unbrowsed areas. In other words, while deer herbivory may influence plant species composition, especially in mid successional stages, a browsed forest will attain the same climax community as a completely unbrowsed forest over the long term.

Based upon these findings, the Final EIS must explain how deer herbivory will affect the health and continued survival of the forest into the future. If the Park cannot do so, it will seriously call into question the purpose of this lethal control in the absence of eminent threats to any aspect of the VFNHP ecosystem.

Corr. ID: 1108**Organization:** Animal Welfare Institute**Comment ID:** 93746**Organization Type:** Conservation/Preservation

Representative Quote: The NPS states that the VFNHP supports over 1,300 species of flora and fauna and a variety of habitats within the park including oak/tulip forests, tall grass meadows, wetlands, and forested floodplains. Draft EIS at v, 1-4. Considering the alleged size and high density of the deer population, the fact that, according to NPS estimates, the park's deer population was even larger in the past, and the litany of adverse impacts that the NPS attributes to deer, it is rather remarkable that VFNHP supports that diversity of flora and fauna.

Corr. ID: 1108**Organization:** Animal Welfare Institute**Comment ID:** 93749**Organization Type:** Conservation/Preservation

Representative Quote: Information contained in the Draft EIS in regard to some of the floral habitat and communities in VFNHP contradict the NPS claim that the deer are causing significant damage to park vegetation. For example, the Draft EIS reports that the "park's tall grass meadows represent one of the largest occurrences of remnant open grasslands in eastern Pennsylvania and have been identified as important habitat for breeding grassland bird species. Draft EIS at 3-5. It goes on to report that, in 2007, an inventory of this meadow habitat "documented the presence of 337 plant species, dominated by warm and cool season grasses" with the "warm season meadow community ... dominated by native grasses." Id. Though nonnative species are also found in this community type, the large proportion of native species calls into question whether the park's deer are adversely impacting such habitats.

RESPONSE:

The land within Valley Forge NHP has a long history of use and significant changes in forests associated with industry (e.g., quarrying limestone), clearing for development and agriculture, harvesting for charcoal, fenceposts, fuel, and building materials and the 1777-1778 winter encampment of the Continental Army (See Section 3.3.1: Cultural Landscapes). Through ecosystem management, Valley Forge protects the natural processes and functions of the forest appropriate to its successional stage. One of the most important processes is forest regeneration. Plant diversity is not the metric that has been chosen to assess the impact of deer on forest plant communities. Rather, it is the impact of deer on tree regeneration that is being used to evaluate plan success.

As stated on pages 1-17 and 3-11 of the plan/EIS, unfenced monitoring plots have not exhibited adequate tree regeneration since 1995. This failure will lead to a net loss of forested habitat over time as trees die and are not replaced through recruitment.

Formal inventories of park flora (vegetation mapping, description of plant communities, meadow plant communities) and fauna (amphibians, bats, birds, mammals, and reptiles) species were completed between 2001 and 2008 as part of the NPS Inventory and Monitoring Program. Inventories were conducted by qualified professionals using sound scientific methods. The results of these inventories are presented in Chapter 3 and they are considered by the NPS to represent a reliable baseline for species occurrence, abundance, and distribution. High diversity within the park is primarily attributed to the large size of the park compared to surrounding areas of open space and the presence of a variety of habitats, particularly relatively large areas of forest and grassland.

AE13500 - Affected Environment: Cultural Landscapes

CONCERN ID: 19658

CONCERN STATEMENT: Commenters stated that deer should not be blamed for the destruction of the cultural landscape at the park, but rather this destruction is a result of management decisions not to return the cultural landscape back to the conditions of 1777, as well as the development inside and outside the park.

REPRESENTATIVE QUOTE(S): **Corr. ID:** 1108 **Organization:** Animal Welfare Institute

Comment ID: 93794 **Organization Type:** Conservation/Preservation

Representative Quote: According to the Draft EIS, at that time the area had been cleared of all trees so that the timber could be used for hut construction, earthworks, or burned as fuel. Draft EIS at 3-28. Since then the NPS concedes that the character of the park has changed and has elected to not to return the cultural landscape to the conditions of 1777 and instead manage to preserve certain historical landscapes along with subsequent changes to the park's landscape. Since the current cultural landscape is very different than the landscape of the encampment period, both because of industrial/residential development outside VFNHP and also because of management decisions within the park, it is inappropriate to blame deer for damage done to the cultural landscape.

RESPONSE:

The commemorative landscape is, in fact, the cultural landscape of the park. The Valley Forge NHP GMP/EIS clarifies that the commemorative landscape, with its relative patterns of forested and open lands, would be preserved. The potential loss of forests due to lack of recruitment would result in loss of the cultural landscape as defined by the GMP/EIS. Reconstruction of an 18th century landscape was specifically rejected by the GMP/EIS.

AE24000 - Affected Environment: White-tailed Deer Population

CONCERN ID: 19661

CONCERN STATEMENT: Commenters stated that the plan/EIS does not provide adequate data on the current deer herd in the park, such as population size, sex ratio, and age structure, thus impeding the ability for the public to sufficiently choose a preferred alternative.

**REPRESENTATIVE
QUOTE(S):****Corr. ID:** 951**Organization:** *Not Specified***Comment ID:** 92921**Organization Type:** Unaffiliated Individual

Representative Quote: Speaking of deer, according to the Plan, the deer population in the Park ranges from 375 (a decline of 150 in three years) to over 1,000 depending on the measurement used. A more exact count is needed before choosing any Alternative, especially one that is deadly, not merely to wildlife.

Corr. ID: 1108**Organization:** Animal Welfare Institute**Comment ID:** 93781**Organization Type:** Conservation/Preservation

Representative Quote: The NPS fails to provide any data on the herd's age structure, age-specific mortality or productivity rates, it provides contradictory data on the sex-ratio of the population, and it fails to disclose the full complement of deer data that it has collected. For example, instead of disclosing all of its spring compartment count or fall spotlight count data collected over time, the NPS simply summarizes that data. By doing so, the NPS makes it impossible to compare deer demographics to, for example, climatic data to identify potential patterns linking a particularly severe winter or extended drought conditions to changes in deer demographics.

Corr. ID: 1108**Organization:** Animal Welfare Institute**Comment ID:** 93780**Organization Type:** Conservation/Preservation

Representative Quote: The NPS contends that "data on demographic factors such as sex ratio, age structure, and abundance are easily collected by natural resource managers and are used in modeling wildlife population dynamics." Draft EIS at 4-26. Such demographic factors also include productivity, survival, harvest rate/mortality rate, and rate of population growth." Id.

Despite the apparent ease in collecting demographic data on deer, the NPS has failed to disclose much of that data for VFNHP deer either because it hasn't collected such data or because it simply ignored its legal obligation to disclose such information.

RESPONSE:

The park has presented all available data related to estimated deer population size and trends in abundance over time (See pages 1-14 through 1-15 and 3-11 through 3-24). The plan/EIS has been updated throughout to include the most recent information on deer population size in 2008 and 2009. In Chapter 3, the section on mortality has been updated to include available information on sex ratio and age structure of deer involved in deer-vehicle collisions (See page 3-21). The NPS considers this data sufficient both for the development of alternatives and evaluation of impacts.

CONCERN ID:

19664

**CONCERN
STATEMENT:**

Commenters stated that incorrect assumptions about the deer population and their health were reported in the plan/DEIS, specifically that it is either unclear why the deer population has decreased over the last three years, or that the decrease in population can be attributed to the deer herd naturally controlling their reproduction rate.

**REPRESENTATIVE
QUOTE(S):****Corr. ID:** 15**Organization:** *Not Specified***Comment ID:** 92029**Organization Type:** Unaffiliated Individual

Representative Quote: COMMENT ON NHP'S POPULATION ESTIMATES: NHP's population estimates of 193 deer per sq. mile, and the estimate process used to get this figure is not accurate or based on science. NHP needs to do an aerial survey to get an accurate population estimate at Valley Forge.

Corr. ID: 215**Organization:** *Not Specified***Comment ID:** 93414**Organization Type:** Unaffiliated Individual

Representative Quote: I have also read that it has been established that over the last three years the deer population @ Valley Forge NHP has been reduced not increased. I

am unclear what brought this decrease in population?

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93751

Organization Type: Conservation/Preservation

Representative Quote: The NPS's own spotlight survey data demonstrate that the park's deer population size has declined rather dramatically from 2002 to 2007. According to the data, graphically illustrated in Figure 10 (Draft EIS at 3-12) the number of deer observed on fall spotlight surveys have declined from nearly 600 in 2002 and 2003 to approximately 350 in 2007. This nearly 50 percent decline in deer observed during spotlight surveys combined with the declining condition of park deer would suggest that the park's deer population is in decline as it naturally adjusts to the ecological carrying capacity within VFNHP.

The foregoing evidence provides sufficient cause to question the assertions made by the NPS that the VFNHP deer population is "overabundant," that its density is too high, or that it is causing excessive or unacceptable impacts to vegetation, forest health, other wildlife species, special status plant and animal species, park operations, visitor use, and public safety.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93747

Organization Type: Conservation/Preservation

Representative Quote: The average home range for female deer who have greater than 50 percent of their home range area within the park is 0.46 square miles (Draft EIS at 1-7, 1-15, 3-11) compared to 0.35 square miles for female deer with "less than 50% of their home range area outside the park." Draft EIS at 1-15, 3-11. The majority of the female deer (79%) spent most of their time within the park traveling, on average, only 401 feet beyond the park border. Draft EIS at 1-15. For those female deer with the majority of their range outside the park, they traveled an average of 1,325 feet beyond the park boundary. Draft EIS at 3-11.

Considering that the statewide average home range size for female deer is 1.0 square miles, this would suggest that habitat quality within VFNHP is better than the average habitat quality in the remainder of Pennsylvania. Considering that most of the deer populations throughout the state are controlled by hunting and that the average estimated density of deer statewide is approximately 30 deer per square mile, it is inconceivable that -- given the estimated high density of deer in VFNHP, the claim that the deer have persisted at such densities for years, and the alleged impacts of those deer on VFNHP habitats (including forest and meadow habitat) -- deer within the VFNHP maintain such small range sizes. Thus, the density and home range estimates in the park are wrong, the density and home range estimates outside the park are wrong, or allegations that the VFNHP deer herd is decimating the park's habitat conditions are wrong.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93748

Organization Type: Conservation/Preservation

Representative Quote: The NPS has assessed the condition of deer over several decades. Studies in 1983-84 determined that the VFNHP deer were in "good physical condition." Draft EIS at 1-15, 3-20. Survey efforts by park staff between 1992 and 1995 resulted in no trends in body size in fawn, yearling, or adult deer. Draft EIS at 1-15, 3-20. Yet, when certain body size statistics were compared with other Pennsylvania deer populations, the NPS found that park deer were generally smaller. Draft EIS at 1-16, 3-20. A second assessment in 1997-99 indicated that adult deer within the park were similar in size to other Pennsylvania deer populations. Draft EIS at 1-15. However, based on body measurements, female deer in the park exhibited a decreasing trend between 1997 and 1999 compared to non-park deer and male fawn weight also decreased between 1997 and 1999. Draft EIS at 3-21, 4-28.

Despite these trends and the fact that the most recent deer condition assessment was conducted ten years ago, the NPS claims that "there is no clear indication that the health

of the deer at Valley Forge NHP is declining." Draft EIS at 3-21. Conversely, in citing to data more than ten years old the NPS claims that "signs of declining condition are just being detected in yearlings and fawns ... which may be a first indicator of change in habitat quality for deer," Draft EIS at 4-34. Similarly, when assessing the impact of Alternative A on the park's deer population, the NPS contends that "it is assumed that the physical condition of deer at Valley Forge will decline/continue to decline over time."

Either the health of the deer at VFNHP is declining or it's not. The NPS cannot make both claims in the same environmental document. Doing so demonstrates, at best, a lack of care in proofreading the document or, at worst, a purposeful attempt to make the public support the proposed alternative by suggested that, at present, the existing deer are unhealthy and suffering. Even if the condition of the deer is declining, this should be interpreted as a sign that the population is coming into a sort of equilibrium with its habitat and not a trigger for lethal control.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93750

Organization Type: Conservation/Preservation

Representative Quote: Though no productivity data is available for park deer, PGC data for deer surrounding the park indicates low reproduction in yearlings (0.4 fawns per doe) and relatively high reproduction in adult females (1.8 fawns per doe) while the average reproductive rate for does across the state is 1.0 fawns per doe. Draft EIS at 4-29, 2-37 (referring to embryos per doe or fawn).

Assuming that these statistics can be applied to park deer is a mistake since the density of deer inside and outside the park are, according to the NPS, so different. The density outside the park is estimated at 29 deer per square mile, Draft EIS at 2-17, while the NPS claims its deer density is at 193 deer per square mile. Though the latter estimate is likely a significant overestimate, the higher the deer density in the park, the lower the deer reproduction rate unless park habitats are of exceedingly high quality.

Of course, if park deer were producing 1.8 fawns per doe or if the quality of the park habitat maintained such high levels of productivity in the deer herd (despite the herd's estimated large number, high density, and so-called adverse impacts to the park), then the NPS proposal to engage in a large-scale deer slaughter would have not legitimate justification and would purely be the product of an inherent bias against deer, an unwillingness to wait for the deer population to stabilize itself around a dynamic equilibrium, and a wanton disregard for NPS legal mandates.

RESPONSE:

Regarding downward trends in deer population size between 2005 and 2007, see response to GA3000 – Impact Analysis: General Methodology for Establishing Impacts/Effects, Concern ID 19858 (page F-90). As described in the plan/EIS, the deer population at Valley Forge NHP has exhibited fluctuations in size since 1996, which is typical for white-tailed deer. Over the 13 years (1997-2009) since implementation of spring compartment counts, the population density has varied but has exhibited an overall upward trend in deer density from 146 and 241 deer per square mile. Even the lowest population density of 146 deer per square mile, the deer density was 5 times higher than the target deer density goal to promote adequate tree regeneration.

The plan has been updated to reflect estimated deer population size in 2008 and 2009, which supports a continuing upward trend in deer population size (See pages 1-14 and 3-13). These data show that we cannot rely upon natural population controls to protect the forest and accomplish the plan/EIS goals and objectives.

The plan/EIS has been updated to clarify information related to deer condition (see pages 1-15 through 1-16 and 3-22). Available data on deer condition is presented solely for the purpose of background information. This data has been collected using different methods (e.g., qualitative versus quantitative) that do not allow for comparison across studies or therefore over time. No research has been conducted specifically for the purposes of rigorously evaluating herd health or condition in the park. Overall, existing data indicate

that as of 1999, deer at Valley Forge were in average condition compared to other deer populations in Pennsylvania and there was no strong evidence indicating that the physical condition of the deer at Valley Forge NHP was declining. However, available data also suggests that the population was likely experiencing some level of nutritional stress at that time. This statement is supported by the generally smaller size of younger deer (fawns and yearlings) compared to other deer populations (Heister 1996) and the slight downward trend in fawn body size reported between 1997 and 1999 (Rowe and Heister 1999). Although the impacts of nutritional stress are often first evident in younger animals, habitat at the park appears to have been sufficient for older to grow and recover to a point where they were similar in size to other Pennsylvania deer populations as described by Lovallo and Tzilkowski (2003).

The NPS states on pages 1-16 and 3-22 of the plan/EIS, that it does not believe there is strong evidence indicating that the physical condition of the deer at Valley Forge NHP was declining as of 1999. However, the NPS does suggest that signs of nutritional stress were starting to be detected at this time as suggested by smaller body size in young deer. Current body size and condition of deer in the park is unknown, however anecdotal evidence from park resource management and law enforcement staff suggests the trend toward smaller body size has continued to the present. Based on the wide body of literature related to habitat condition, nutritional stress, and deer condition, the NPS also believes it would be reasonable to assume that continued habitat degradation in the park would likely increase the level of nutritional stress experienced by the deer population and could result in a change in deer condition (decline) in the future.

AE28000 - Affected Environment: Park Operations

CONCERN ID: 19667

CONCERN STATEMENT: One commenter stated that the current policies of the park, particularly the Agricultural Leasing Program, is at fault for the increase in deer population within the park, as well as the carrying capacity, adding that the park should first address this leasing program before lethally removing any deer.

REPRESENTATIVE QUOTE(S):

Corr. ID: 1108 **Organization:** Animal Welfare Institute

Comment ID: 93773 **Organization Type:** Conservation/Preservation

Representative Quote: The NPS Agricultural Leasing Program: Remarkably, despite the concerns that the NPS has regarding deer at VFNHP, it continues to permit agricultural use of VFHNP lands north of the Schuylkill River. Draft EIS at 4-7. Considering the benefits that such agricultural lands may provide to deer in regard to providing an easily accessible food source, the failure of the NPS to terminate this lease and to rehabilitate this land to restore it to more natural conditions is disconcerting. While the NPS claims that the high deer density in VFNHP has led to only wheat and hay being grown in these fields during the last several years, Draft EIS at 4-7, these crops remain palatable to deer and, consequently, this operation likely increased the ecological carrying capacity for deer in VFNHP. It is unconscionable that the NPS would even contemplate the mass slaughter of park deer while continuing to permit an agricultural operation in VFNHP.

RESPONSE: The plan/EIS has been updated on page 4-7 to make clear the fact that no lands in the park have been leased for the purposes of agriculture since 2003. There are no current plans to implement agricultural leasing as a means to manage park fields however, this action would be re-evaluated when the Field Management Plan is revised in 2010-2011.

AR4000 - Archeological Resources: Impact of Proposal and Alternatives

CONCERN ID: 19713

CONCERN STATEMENT: One commenter stated that the impact analysis for archeological resources does not consider potential mitigation measures, such as utilizing a qualified archaeologist on-site during construction activities, and further questioned whether the potential adverse impacts to archeological resources justifies lethal reduction of the deer herd.

**REPRESENTATIVE
QUOTE(S):****Corr. ID:** 1108**Organization:** Animal Welfare Institute**Comment ID:** 93797**Organization Type:** Conservation/Preservation

Representative Quote: Recognizing the historical significance of VFNHP, the possibility for archaeological damage exists as a result of any activity within VFNHP. In this case, the NPS claims that the installation of fence posts associated with the construction of protective fencing (Alternative A) or rotational fencing (Alternative B) could impact archaeological resources. It could, but do such impacts negate these alternatives as valid management options and/or justify the large-scale slaughter of deer in VFNHP. Moreover, such impacts can be minimized or eliminated by ensuring that a qualified archaeologist is on site during construction activities, imposing construction plans that require the reporting of any potential archaeological resource, and requiring the cessation of construction activities if such resources are found.

RESPONSE:

Page 4-66 of the plan calls for an archeologist to survey the potential locations for fencing and to be onsite during construction activities to supervise the work and ensure that no resources were impacted. This level of mitigation is acceptable to the NPS; however, it is not the reason an alternative with lethal reduction methods was selected. Alternative B was not selected as the NPS preferred alternative because it fails to meet many of the objectives of the plan, including reducing deer browsing pressure enough to promote tree and shrub regeneration that results in a diverse forest structure dominated by native species.

HS2000 - Historic Structures: Methodology and Assumptions**CONCERN ID:**

19739

**CONCERN
STATEMENT:**

One commenter stated that the plan/DEIS did not contain sufficient data to state that there would be impacts to historic earthworks. Commenters requested pictures of damaged earthworks and information on how much damage is caused by deer versus humans.

**REPRESENTATIVE
QUOTE(S):****Corr. ID:** 1108**Organization:** Animal Welfare Institute**Comment ID:** 93796**Organization Type:** Conservation/Preservation

Representative Quote: In regard to historic structures, the primary concern is with the earthworks that the NPS claim are being damaged by deer resulting in trampling, compaction of soil, and erosion. Draft EIS at 31. The NPS has failed to disclose sufficient information about these impacts. For example, there is little information contained in the Draft EIS identify the location of these earthworks, explaining what specific areas have been subject to the alleged damage by deer, the severity of the damage, whether mitigation measures have been employed to halt the alleged damage, and whether those measures have been successful. The Draft EIS does concede that trampling attributable to people also pose a threat to the earthworks, Draft EIS at 4-8, though it fails to specify what proportion of the alleged existing damage is attributable to humans versus deer. Indeed, the Draft EIS contains no pictures of damaged earthworks. Without such evidence, including visual evidence, it is not entirely clear how significant this alleged impact is or whether the NPS is exaggerating this impact as another example of its inherent bias against deer.

RESPONSE:

As indicated in the plan/EIS on page 1-2, the purpose of the plan/EIS is to develop a deer management strategy that promotes the protection, preservation, and restoration of native vegetation and other natural and cultural resources. The NPS is not justifying a management action based on the effects of deer on historic structures. Tree regeneration has been selected as the metric used to evaluate plan success rather than the integrity of historic earthworks. However, promoting the growth of native plant communities to minimize soil erosion is considered one of the most important strategies for the protection of this type [earthen] of structure and is considered a critical step toward long-term preservation. Actions to preserve encampment-period earthworks outside the scope of the plan/EIS were analyzed in greater detail in the Valley Forge NHP GMP/EIS (2007i).

PO4000 - Park Operations: Impact Of Proposal And Alternatives**CONCERN ID:** 19756

CONCERN STATEMENT: Commenters questioned the analysis of impacts to park operations, stating that it cannot be assumed that other areas of park management would be impacted through implementation of the alternatives, and that the cost analysis for implementing the alternatives is incomplete and needs to be reevaluated.

REPRESENTATIVE QUOTE(S):

Organization: Animal Welfare Institute**Comment ID:** 93812**Organization Type:** Conservation/Preservation

Representative Quote: In regard to the cost of purchasing and installing rotational fencing, despite the assumption made by the NPS that it would receive full funding to cover the cost of the alternative selected, it claims that costs associated with the construction, maintenance, and moving the rotational fencing would be in addition to the park's present budget result in a long-term, major, adverse impact. Draft EIS at 4-93. This doesn't make sense. If there is an assumption that funding will be sufficient to cover the cost of whichever alternative is selected, then the impact to the park's present budget would be inconsequential. If there were no such increase in the park's budget, then the impacts could be significant though this distinction is not made in the analysis.

Corr. ID: 1108**Organization:** Animal Welfare Institute**Comment ID:** 93811**Organization Type:** Conservation/Preservation

Representative Quote: In regard to the assessment of the impacts of the proposed action on park operations, the NPS specifies that it assumes that under all alternatives the park's annual budget would be increase to implement a particular alternative but that this funding is not guaranteed. Draft EIS at 4-90. As a result, the NPS states that each alternative discussed the impacts of receiving or not receiving additional funding. Id. This was not done. In it assessment of the impact of the proposed alternative on park operations, the NPS assumed that it would not have sufficient funding thereby necessitating the reallocation of funds from other park programs thereby reducing the effectiveness of those programs. See e.g., Draft EIS at 4-91. While that may be a reality given current budget limitations, suggesting that other park programs may suffer because of funding shortfalls to implement deer management serves only to garner greater condemnation for the park's deer herd among those park loyalists who ay be concerned that they may be deprived of unique educational, cultural, and historical experiences in the park because of deer.

RESPONSE:

In fiscal year (FY) 2007, the NPS requested additional funding for implementation of the plan/EIS through the Operations Formulation System (OFS). At the time the draft plan/EIS was released, this increase had not been approved by Congress. The FY2009, federal appropriation provided Valley Forge NHP with \$140,000 for implementation of the plan/EIS. It is anticipated that this funding would continue to be received annually; however, funding is not guaranteed and current funding is not expected to cover the full costs of implementation (see page 4-90). Additional funds may be received in the future. Impacts of each alternative on park operations have been updated to reflect the increase described above.

CONCERN ID: 19897

CONCERN STATEMENT: One commenter stated that, based on the cost of alternative D, implementation of alternative D would have adverse effects on education and restoration activities. Another commenter stated alternative D could be improved by imposing a spending limit.

REPRESENTATIVE QUOTE(S):

Organization: *Not Specified***Comment ID:** 92478**Organization Type:** Unaffiliated Individual

Representative Quote: I am against your plan to kill the deer in the Valley Forge park. Your proposal using Alternative D will cost, per your estimates, \$2,778,282 to

\$2,845,782 for the 15 years of the plan. Using the highest amount, that is \$189,718 per year, and from your website you list sharpshooting costs to be \$121 on average per deer removed.

Using this much money just for removal of deer will mean that education and restoration will be compromised. It is a huge waste of taxpayer dollars in this time of economic disaster.

Corr. ID: 1088

Organization: *Not Specified*

Comment ID: 93641

Organization Type: Unaffiliated Individual

Representative Quote: Improve alternatives by putting a spending cap on Alternative D.

RESPONSE:

As described in Section 4.8: Impacts on Park Operations, plan/EIS implementation under Alternative D would be expected to result in increased educational and interpretive activities that would require additional funding and staff time to implement. This would result in long-term, minor, adverse impacts to resource interpretation staff, depending on the level of activities required. However, over the long-term this alternative would result in a greater decrease in the deer population over a shorter period of time, when compared to Alternative A or B. As the number of deer declined in the park, the need for deer management and associated educational/interpretative activities would decline, allowing park staff to apply their efforts to other management areas. This would result in a long-term beneficial impact, with adverse impacts being reduced to negligible over the long-term.

As described in Section 4.8: Impacts on Park Operations, plan/EIS implementation under Alternative D would result in long-term, minor, adverse impacts to park operations in terms of staff time. Under Alternative D, the significant reduction in deer density would be expected to have a long-term beneficial impact on vegetation, which would increase the success of park restoration efforts by reducing deer browse, eliminating the need for small-scale fencing, and promoting the growth of native species. Actions under this alternative would not be expected to reduce staff time available to conduct restoration activities because these activities occur during the growing season (April-October) and deer management actions would occur between November and March. Additionally, elimination of actions currently needed to protect native vegetation from deer browse may result in a reduction of costs and staff time associated with restoration activities.

Imposing a "spending cap" on any deer management alternative presented in the plan/EIS would be inappropriate. Costs presented in the plan/EIS reflect the amount of funding required to fully implement an alternative and achieve the plan objectives. The plan/EIS has been updated to reflect the fact that the FY2009 federal appropriations provides an increase of \$140,000 for implementation of the plan/EIS and restoration of native vegetation (page 4-90). It is anticipated that this funding would continue to be received annually; however, funding is not guaranteed and current funding is not expected to cover the full costs of implementation. Additional funds may be received in the future. Impacts of each alternative on park operations have been updated to reflect the increase described above. Cost is only one consideration in the identification and development of reasonable alternatives under NEPA. Alternatives that were fully developed and presented in the plan/EIS are considered by the NPS to be both technically and economically feasible.

PS2000 - Public Safety: Methodology and Assumptions

CONCERN ID: 19758

**CONCERN
STATEMENT:**

One commenter stated that while the plan/DEIS claims that deer pose a risk to public safety as a result of their role in transmitting Lyme disease, the plan/DEIS does not provide sufficient information regarding the number of confirmed cases of Lyme disease in the region. Other commenters stated that the assumptions regarding Lyme disease in the plan/DEIS were not correct because a decreasing the number of deer would not result in a decrease in Lyme disease.

**REPRESENTATIVE
QUOTE(S):****Corr. ID:** 28**Organization:** *Not Specified***Comment ID:** 93187**Organization Type:** Unaffiliated Individual

Representative Quote: I'm also concerned about Lyme disease on my property. I attended one of the public meetings this week and some of the members of the public stated that reduction in the deer population had been proven not to decrease the incidence of Lyme disease and even increased the number of ticks on people and pets. No reference was given, but a search of the literature revealed that this assertion is probably in reference to Jordan RA, Schulze TL, Jahn MB. "Effects of reduced deer density on the abundance of Ixodes scapularis (Acari: Ixodidae) and Lyme disease incidence in a northern New Jersey endemic area." J Med Entomol 2007;44(5):752-7. In this study, the deer population in a suburban area was reduced by approximately 50% and there was no measureable decrease in the number of ticks or incidence of Lyme disease. There are several reasons not to conclude from this study that deer reduction in Valley Forge will not impact the occurrence of Lyme disease. First, it is important to note that the deer population in this study was only cut in half. It could be that there is a positive correlation between deer population and Lyme disease occurrence, but that the error inherent in the measurements masked the effect. Second, if the deer population was only decreased by 50%, the remaining deer might still eat all the food in their preferred habitats and travel to the same yards and spread ticks in the same pattern as the larger herd.

Corr. ID: 993**Organization:** *Not Specified***Comment ID:** 92618**Organization Type:** Unaffiliated Individual

Representative Quote: LYME DISEASE Get the facts. MYTH: An overabundance of deer causes Lyme disease. FACT: Black-legged ticks (so-called "deer ticks") are actually carried by 49 bird species and nearly all mammals. Studies have shown that even if the vast majority of deer are killed, the overall number of "deer ticks" are not significantly reduced because the ticks simply move to other host animals or occur at higher densities on the remaining deer. No studies show that deer hunting reduces the tick population enough to eliminate Lyme disease risk to humans. Therefore, the proposed hunt will do little or nothing to reduce the possibility of Lyme disease infection. However, public education and awareness will help.

Corr. ID: 1108**Organization:** Animal Welfare Institute**Comment ID:** 93803**Organization Type:** Conservation/Preservation

Representative Quote: The NPS also claims that deer pose a risk to public safety as a result of their alleged role in the transmission of Lyme disease to humans. The NPS fails to provide any data on the number of confirmed Lyme diseases cases in humans in the local area or region yet it continues to vilify deer because they may act as a host for the deer tick during a portion of the tick's life. To its credit, the NPS does concede that "deer cannot transmit the disease to humans or ticks," Draft EIS at 1-32, that white-footed mice the primary carrier of the disease are abundant in the park, that even in the absence of any deer within the park, Lyme disease would likely still occur, Draft EIS at 3-35, and that on 3 percent of the tick population sampled in 1995 revealed the presence of Lyme disease. Id. Yet, it claims, without citing to any evidence, that "a high deer population provides more hosts and may support a higher than normal tick populations compared to lower deer densities." Draft EIS at 1-32.

RESPONSE:

As stated on page 3-36, Pennsylvania ranks second in the nation for number of reported cases of Lyme disease, with the majority being reported from southeastern areas of the state near Valley Forge NHP. Between 2003 and 2007, Chester County ranked second in the state for reported cases of Lyme disease (PA Department of Health 2008). The NPS agrees that deer represent only one of many potential host species and that even in the absence of any deer within the park, Lyme disease would likely still occur (see page 3-37).

The United States Department of Health and Human Services, Centers for Disease Control and Prevention (CDC) has stated that abundant deer and rodent hosts are

necessary to maintain the spirochete *Borrelia burgdorferi*. Though the deer cannot transmit the disease to humans or ticks, a high deer population provides more hosts and may support a higher than normal tick population compared to lower deer densities (see page 1-34). The citation provided by the commenter is discussed on the CDC webpage references a study in mainland New Jersey that reported reducing the number of deer did not correspond to decreased numbers of ticks or reduced cases of Lyme disease. However, as stated on the CDC webpage, this study may have been too short or the reduction of deer insufficient to demonstrate an impact. However, it also cites other data which support the statement that lowered deer populations may lead to lowered tick populations (Stafford 2007). The plan/EIS has been updated with this citation. For additional information on this topic please visit http://www.cdc.gov/ncidod/dvbid/lyme/Prevention/Id_Prevention_Control_Deer.htm.

The intensity thresholds related to Public Safety (see page 4-84) have been updated to clearly articulate that the analysis of impacts was based on the likelihood of encountering a deer tick and not on the likelihood of acquiring Lyme disease. Citations related to deer and tick populations and Lyme disease have been added as appropriate. Information presented in the plan/EIS regarding the relationship between deer population size and tick populations is considered sufficient to assess the likely effects of deer on tick populations.

Additional information on the incidence of Lyme disease in Pennsylvania and related information can be found on the Pennsylvania Department of Health webpage at: <http://www.dsf.health.state.pa.us/health/cwp/view.asp?a=171&Q=230464>.

Additional information is available from:

Stafford, K. C. 2007. The Tick Management Handbook: An integrated guide for homeowners, pest control operators, and public health officials for the prevention of tick-associated disease. Bulletin No. 1010. The Connecticut Agricultural Experiment Station, New Haven CT.

CONCERN ID:

19759

CONCERN STATEMENT:

Commenters stated that preventing deer-vehicle collisions should be included as an objective in taking action and state that the plan/DEIS does not provide sufficient information regarding the frequency, location, severity, injury or mortality rate, or estimated costs of damages related to deer/vehicle accidents.

REPRESENTATIVE QUOTE(S):

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93801

Organization Type: Conservation/Preservation

Representative Quote: Similarly, in regard to deer vehicle collisions, the NPS provides virtually no data relevant to the frequency, location, severity, human injury/mortality rate, or the estimated costs to repair damage to vehicles that strike deer. It does concede that deer-vehicle collisions represent the primary cause of deer mortality for park deer. Draft EIS at 2-10. It also fails to disclose what the current speed limits are for vehicles using the various roads within and surrounding VFNHP, traffic volume data and trends over time, whether any speed zones have been established in an attempt to reduce deer vehicle collisions, what educational efforts are made by the NPS or PGC to caution drivers to be alert for deer crossings during the most dangerous times of the year, or if other alternatives/techniques are used to reduce deer-vehicle collisions.

Corr. ID: 1109

Organization: Pennsylvania Game Commission

Comment ID: 92986

Organization Type: State Government

Representative Quote: Deer have a significant impact on surrounding lands and people traveling through and around the park. These impacts should be given considerable weight given the landscape in which Valley Forge (VF) is located yet nothing is mentioned in the objectives about these human impacts. For example, deer-vehicle collisions are the primary cause of mortality for deer at VF.

RESPONSE:

The purpose of the plan/EIS is to develop a deer management strategy that supports the protection, preservation, and restoration of native vegetation and other natural and cultural resources. Forest regeneration has been selected as the primary measure of plan success rather than the number of deer-vehicle collisions. Although NPS recognizes deer-vehicle collisions as a public safety issue, consideration of alternatives specifically to address this issue is outside the scope of this plan/EIS and does not meet the plan/EIS purpose, need, and objectives. Chapter 4: Environmental Consequences, provides a full evaluation of the impacts of implementation of deer management alternatives on public safety, including the likelihood of being involved in a deer-vehicle collision. Refer to Section 4.7 Public Safety (beginning on page 4-84).

As described on page 4-86 of the plan/EIS, actions being implemented (now or in the future) in the park to address traffic and associated public safety issues include road closures, traffic calming measures (reduced speed limits, signage, road surfaces that encourage slower speeds, increased signage and signals to control traffic movements), and vegetation management along roadsides. Implementation of these actions has already begun and they are expected significantly improve public safety and visitor experience as well as contribute to reducing the likelihood of being involved in a deer-vehicle collision. These actions are expected to have a long-term beneficial impact on public safety (page 4-86). A full description of traffic calming measures and other issues and actions associated with public safety can be found in the park GMP/EIS (2007i).

PS4000 - Public Safety: Impact of Proposal and Alternatives

CONCERN ID: 20119

CONCERN STATEMENT: Commenters raised concern about the plan/DEIS regarding adjacent land uses including liability for accidental injury and death.

REPRESENTATIVE QUOTE(S):

Organization: *Not Specified*

Comment ID: 93630

Organization Type: Unaffiliated Individual

Representative Quote: Who will be liable for possible accidental property damage, injury, or death? Will the park take full responsibility for a lawsuit? If so, that means my tax dollars going towards a lawsuit for an action which I do not sanction.

RESPONSE:

The United States is liable for tort, which includes personal property and personal injury under the Federal Tort Claims Act (28 USC 1346(b) 2671 2680). Please refer also to response to Concern ID 19683 (page F-45).

SRAL2000 - Socioeconomic Resources and Adjacent Lands: Methodology and Assumptions

CONCERN ID: 19764

CONCERN STATEMENT: One commenter states that while the plan/DEIS claims that adverse impacts to socioeconomics and adjacent lands are a result of the overpopulation of deer, the plan fails to disclose sufficient information for the public to assess the severity of the impacts. Another commenter questioned studies used in determining adverse impacts to socioeconomics and damage to landscape vegetation, mainly concerning the fact that the studies used were not conducted within the local area.

REPRESENTATIVE QUOTE(S):

Organization: *Not Specified*

Comment ID: 93223

Organization Type: Unaffiliated Individual

Representative Quote: 3.5.2 Vehicular Damage

Collisions with deer affect vehicular maintenance costs. Based on insurance claims across the nation, Pennsylvania has had the highest number of deer-vehicle collisions in four of the last five years, averaging 99,000 incidents a year. Pennsylvania also has the highest number of deer-vehicle collisions per mile of road, with a collision occurring every 1.22 miles of public road (Frye 2007).

" What is the number of deer-vehicle collisions per mile of road within Valley Forge NHP?

" Is this numeric value higher or lower than Pennsylvania's average?

" Based on the data the plan provides, less than .008 percent of Pennsylvania's deer-vehicle collision occur within Valley Forge NHP. What is the percentage goal of VFNHP? How does this compare with other similar parks in the US that have active state roads running through them?

Collisions may result in injuries or death to the passengers and the deer, as well as damages to the vehicle. Vehicle repair bills following a deer collision ranged from \$1,200 to \$2,200, with an average value of \$1,577 in 1993 dollars (Conover et al. 1995). Between 1986 and 2000, insurance claims related to deer-vehicle collisions in the northeastern United States¹ totaled \$390,520,000. Costs in Pennsylvania were estimated at \$150,000,000, or nearly 40% of the total cost in the region (Drake et al. 2005). These figures do not include the cost for medical expenses or deer carcass disposal. These incidents affect public safety and are addressed below, under 3.6 Public Safety.

" The above data is not providing any relevant information in correlation to the incidents that occur within Valley Forge NHP. VFNHP does not have to assume any financial responsibility to deer-vehicle collisions.

" With an average repair value of \$1,577 combined with an average of 87 deer-vehicle collisions annually, equates to an average annual damage total of only \$137,199. This is less than .1% of the total costs estimated for Pennsylvania.

" What is VFNHP's target cost percentage?

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93802

Organization Type: Conservation/Preservation

Representative Quote: Instead, the NPS cites to statewide statistics for deer-vehicle collisions (Draft EIS at 1-32, 3-34) potentially deceiving the public into believing that the significance and severity of deer-vehicle collisions in and around VFNHP is more serious than it really is.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93800

Organization Type: Conservation/Preservation

Representative Quote: Instead of providing such local evidence, the NPS cites to a 1997 survey of 60 million households that estimated deer-related damage to plants and landscape results in \$251 million a year. Draft EIS at 3-33. Either the study was bogus or the NPS description of it is wrong since it suggests that of the 60 million households participating in the study (a preposterous number of people) each experienced over 4 million dollars worth of damage to plants and landscaping. Frankly, such results are inconceivable and cannot be accurate.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93798

Organization Type: Conservation/Preservation

Representative Quote: The NPS claims that the park's deer impact the socioeconomics of the area as a result of "deer browsing damage to crops and landscaping on private lands adjacent to the park" and because "collisions with deer ... affect vehicular maintenance costs." Draft EIS at 1-32. Again, while the NPS is quick to blame the deer for these alleged impacts, it fails to disclose sufficient information to allow the public to assess or gauge the severity of these impacts.

Corr. ID: 1108**Organization:** Animal Welfare Institute**Comment ID:** 93799**Organization Type:** Conservation/Preservation

Representative Quote: For example, with the exception of a reference to VFNHP being contacted by local landowners about deer issues including concerns about deer consuming landscaping plants, Draft EIS at 3-33, the Draft EIS contains no specific information about location of hotspots of deer damage to industrial/residential properties outside of the park, the type of damage document, the extent or severity of such damage, or the economic impact of such damage.

RESPONSE:

Park-specific information on deer-vehicle collisions is presented on page 3-36. The NPS has removed information related to the potential socioeconomic losses associated with deer-vehicle collisions in Pennsylvania found on pages 1-33 and 3-35. It was also removed from the description of impact thresholds for Impacts on Socioeconomic Resources and Adjacent Lands (page 4-78). It is regrettable that removal of this information from the description of impacts and failure to remove it from the intensity thresholds and corresponding sections of the document caused confusion. Economic losses associated with deer-vehicle collisions were removed because level of loss was believed to be closely linked to factors unrelated to the number of deer (such as type of vehicle) which confounded the establishment of intensity thresholds and analysis of impacts. The likelihood of being involved in a deer-vehicle collision remains an element of public safety and impacts has been fully analyzed and evaluated in Section 4.7: Public Safety (beginning on page 4-84).

The purpose of the plan/EIS is to develop a deer management strategy that promotes the protection, preservation, and restoration of native vegetation and other natural and cultural resources. Information provided on the impacts of white-tailed deer on socioeconomic resources and adjacent lands is provided as background information only and not to justify deer management. Tree regeneration has been selected as the primary measure of plan success rather than damage to the landscape/ornamental plantings of adjacent property owners.

The impact of proposed alternatives on socioeconomic resources and adjacent lands, including impacts on ornamental plants on adjacent lands are fully described in Section 4.6 (beginning on page 4-77). The text on page 3-34 has been revised to more clearly state the results of the study by Conover in 1997. Information provided on the impacts of white-tailed deer on socioeconomic resources and adjacent lands is based on referenced scientific literature that the NPS believes is sufficient to assess the likely effects of deer on these resources.

VSSP1000 - Vegetation and Special Status Plant Species: Guiding Policies, Regs, and Laws**CONCERN ID:** 19901**CONCERN****STATEMENT:**

One commenter stated that while the DEIS reports that there are eight state listed (or proposed for listing) plants known to occur within the park, only four of them have legal state-listed status, as documented in Table 8 of the DEIS.

REPRESENTATIVE QUOTE(S):**Corr. ID:** 1108**Organization:** Animal Welfare Institute**Comment ID:** 93770**Organization Type:** Conservation/Preservation

Representative Quote: The NPS has also failed to disclose critical information about these species and their status throughout the state. For example, while the NPS provides information about several of these species in regard to their presence/absence in VFNHP, it is unclear whether or where the species exist outside of the park and/or what efforts are underway by the state to protect and recover these species.

Corr. ID: 1108**Organization:** Animal Welfare Institute**Comment ID:** 93768**Organization Type:** Conservation/Preservation

Representative Quote: Special status plant species. The NPS reports that there are eight

state listed (or proposed for listing) plants that are known or expected to occur within the park. Draft EIS at 3-7. In reality, as documented in Table 8 in the Draft EIS (Draft EIS at 3-7), only four special status plant species confirmed within VFNHP are actually state-listed. The legal status of the four remaining species is "tentatively undetermined" or the species have "no current legal status." Id. Three of these four have been proposed for listing while the last is "under review" for a future listing. Id.

RESPONSE:

The commenter is correct and the plan/EIS has been updated to define non-listed, species of special concern as those determined by the Pennsylvania Natural Heritage Program as critically imperiled, imperiled, or vulnerable. Please refer to Section 3.2.1 Vegetation and Special Status Plant Species (pages 3-7 and 3-8).

VSSP2000 - Vegetation and Special Status Plant Species: Methodology and Assumptions

CONCERN ID: 19769

CONCERN STATEMENT: One commenter stated that reducing the number of deer in the park will not reduce the number of invasive species in the park, further stating that deer are not contributing to the propagation of invasive species.

REPRESENTATIVE QUOTE(S): **Corr. ID:** 557

Organization: *Not Specified*

Comment ID: 91922

Organization Type: Unaffiliated Individual

Representative Quote: VFNP's plan erroneously states that deer are helping invasive species to propagate. In fact, weeding by hand is the best way to reduce invasive species; reducing deer numbers does not reduce invasive species (source: <http://eco.confex.com/eco/2008/techprogram/P11353.HTM> <<http://eco.confex.com/eco/2008/techprogram/P11353.HTM>>). The biggest displacement of native species is happening because of invasive species. (Deer will not produce offspring unless they are getting enough food. So, any concerns about starving deer are unfounded.)

RESPONSE:

The NPS states on page 3-8, that one of the largest threats to the park's flora is the growing population of exotic (nonnative) invasive plant species. The NPS has not made claims that deer in the park "propagate" invasive, non-native plants. However, as stated on page 1-24, the NPS believes that it is the removal of native species through selective deer browsing that has provided nonnative species a competitive advantage resulting in significant spread of certain species over the past two decades. The reduced cover of these nonnative species within fenced plots with established native vegetation provides support for this statement (see photo on page 3-10). Tree regeneration has been selected as the measure of plan success rather than plant diversity or the dominance of non-native plant species and information on nonnative invasive plants is presented as background information only.

The reference provided by the commenter documents vegetation response after exclusion of deer and application of treatments to remove non-native plants over 1 ½ years. The report concludes that "deer management, such as fenced exclusion or population reduction, in the absence of invasive plant removal, may be insufficient to promote restoration of the native plant community" (Bourg 2008). The NPS agrees with the conclusion of the author and states on page 3-8, that "these conditions can be avoided through continued action under the park's integrated pest management (IPM) activities". Current park IPM activities, as described on page 4-7 of the plan/EIS, include implementation of both mechanical (e.g., hand pulling) and chemical methods to control high priority, invasive, non-native plants. The plan recognizes that although there are other factors that affect tree regeneration and forest health (e.g., nonnative plants, fire, global warming), deer must be addressed first because they are the dominant factor influencing native plant communities at the park. The plan/EIS describes an adaptive management approach that includes the potential for adjustments in vegetation management if these factors are determined to be limiting forest regeneration (See page 2-48). These adjustments could include silviculture, nonnative species management, or

responses to the effects of climate change (See response to PN3000 – Purpose and Need: Scope of the Analysis, Concern ID 19747, page F-23).

See: Bourg, N. A. 2008. Interactive effects of white-tailed deer and invasive plants on temperate deciduous forest native plant communities. 93rd Ecological Society of America Annual Meeting. August 3-8, 2008, Milwaukee WI.

VUE4000 - Visitor Use and Experience: Impact of Proposal and Alternatives

CONCERN ID: 19773

CONCERN STATEMENT: Commenters stated that they did not feel that the plan/DEIS adequately analyzed the impacts to visitor experience from a reduction in deer. Many commenters stated that seeing deer was a part of their experience and if they could not see deer, this experience would be impacted. One commenter also questioned the impact that seeing burial pits would have on park visitors.

REPRESENTATIVE QUOTE(S): **Corr. ID:** 65 **Organization:** *Not Specified*

Comment ID: 93579 **Organization Type:** Unaffiliated Individual
Representative Quote: Many visitors to Valley Forge come to see the deer, why take away this attraction?

Corr. ID: 493 **Organization:** *Not Specified*
Comment ID: 91745 **Organization Type:** Unaffiliated Individual
Representative Quote: Both the natural landscape and the quality of the visitor experience will be diminished.

Corr. ID: 583 **Organization:** *Not Specified*
Comment ID: 91986 **Organization Type:** Unaffiliated Individual
Representative Quote: If the "harvesting" of these "excess deer" is undertaken, my family will have to stop visiting the park and enjoying its historic buildings. I can't think of anything more depressing than going there, not seeing the deer we are used to enjoying, and having to explain that to my son.

Corr. ID: 720 **Organization:** Mill Grove Audubon Bird Sanctuary
Comment ID: 92351 **Organization Type:** Conservation/Preservation
Representative Quote: Park managers say "letting well enough alone" will harm the visitor experience. Yet the reverse is true. Killing 80% of the deer WILL harm the visitor experience as I often see visitors pulling over to marvel at and take pictures of the deer.

Corr. ID: 936 **Organization:** *Not Specified*
Comment ID: 93197 **Organization Type:** Unaffiliated Individual
Representative Quote: The draft states that, " Overall, many regional visitors appreciate it as a place of recreation and renewal, with approximately 80% of its visitors enjoying the park while walking, biking, boating, fishing, horseback riding, and picnicking (NPS 2007j)."

" One may ask, How many of the park visitors were polled in regard to the deer presence and population?

" Were the deer viewed by these visitors as an attraction or a nuisance?

" Your response is very vague in the plan and does not provide any statistics or metrics. The draft states, "Another visitor survey was completed in 2007 to assess the role of the park's deer population on the visitor experience (Leong and Decker 2007). Although survey respondents recognized the damage that the deer cause through over browsing and vehicle collisions, deer still are considered an attractive resource at the park. Many respondents noted that deer-watching was one of the enjoyable activities they experienced at Valley Forge NHP. Many respondents did believe that the sight of

malnourished, sick, or injured deer detracted from their experience."

" How many visitors were surveyed?

" How were the questions structured within the survey? Were they "leading" questions?

" What are the percentages of the responses associated with the 2007 visitor survey? It appears that the statements listed in this draft are attempting to avoid having to provide any metrics associated with the survey. Please post the survey and all survey results online for the public to view and to be better informed for when the next revision of this draft is available.

Corr. ID: 936

Organization: *Not Specified*

Comment ID: 93198

Organization Type: Unaffiliated Individual

Representative Quote: " How valid and accurate is the Cornell University survey performed by (Leong and Decker 2007; Siemer et al. 2007) in order for, "the findings of this survey have been used to inform the decision-making process and communication strategy for this plan."?

" Please provide a copy of the questionnaire that was conducted in person and also mailed. The draft states that the survey was directed to, "Members of the community, including adjacent homeowners, community residents, known stakeholders, and community leaders" but why not with the individuals who visited the park as well so as not to provide a biased view of individuals only local to the park. A larger and more diverse survey pool could potentially result in an opposite view of how important the deer herd is as an attraction to Valley Forge NHP.

Corr. ID: 978

Organization: The Humane Society of the United States

Comment ID: 93138

Organization Type: Conservation/Preservation

Representative Quote: Additionally, the EIS makes no mention of how deer burial pits may negatively impact visitor experiences to the park. Considering that 2007 survey indicated that many visitors that come to VFNHP do so to watch deer, it seems highly unlikely that the possibility of seeing or smelling a burial pit or carcasses of deer spread around the park would be appreciated or serve to enhance their experience (EIS pg. 3-32).

Corr. ID: 1001

Organization: *Not Specified*

Comment ID: 93823

Organization Type: Unaffiliated Individual

Representative Quote: this plan will drastically change the landscape and ruin the appeal of the park.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93734

Organization Type: Conservation/Preservation

Representative Quote: Despite all of this evidence documenting the value of deer to park visitors, the NPS, in its assessment of the impact of Alternative A on visitor use, draws the remarkable conclusion that "an increase in deer numbers could also adversely affect the health of the herd, and if the deer population drastically declined due to disease or malnutrition, or if visitors saw ill or emaciated deer, visitor experience could be adversely affected." Draft EIS at 4-69. What's telling about this statement is that the NPS is predicting an adverse impact to the visitor experience if the deer population drastically declines due to disease or malnutrition but not as a consequence of the proposed lethal slaughter of deer.

RESPONSE:

As indicated by the commenter, the NPS has described the attraction that viewing deer holds for the visiting public. The NPS has not proposed the elimination of deer from Valley Forge National Historical Park. As stated on page 1-3, one of the plan/EIS objectives is to maintain a white-tailed deer population within the park that allows for protection and restoration of native plant communities. Therefore, visitors will continue to be able to observe deer at the park.

The impacts on visitor use and experience are documented on pages 4-69 through 4-77. This analysis includes the impact a reduced deer population would have on visitors, as well as the sights and sounds related to implementing the alternatives. This analysis is considered to be of great enough detail to inform the decision making process.

The Cornell University survey titled, "Identifying Capacity for Local Community Participation in Wildlife Management Planning; Case 2: White-tailed Deer Issues at Valley Forge National Historical Park" (Leong and Decker 2007) is cited in the bibliography and available in its entirety on the Internet at <http://www.dnr.cornell.edu/hdru/PUBS/HDRUReport07-3.pdf>.

The Valley Forge NHP GMP/EIS (NPS 2007j) stated that an unusually high percentage of park visitors were from the local community. Therefore, a public survey of the community including adjacent homeowners, community residents, known stakeholders, and community leaders is considered an accurate representation of the park's visitation.

WTD2000 - White-tailed Deer Population: Methodology and Assumptions

CONCERN ID: 19778

CONCERN STATEMENT: One commenter stated that the plan/DEIS fails to consider that white-tailed deer are a keystone species within any habitat they occupy, and that their impacts are not only natural, but expected given the environment inside and outside the park.

REPRESENTATIVE QUOTE(S): **Corr. ID:** 1108 **Organization:** Animal Welfare Institute

Comment ID: 93743 **Organization Type:** Conservation/Preservation

Representative Quote: Despite its failure to consider deer as a keystone species, it admits that deer are, in fact, "keystone" herbivores. Draft EIS at 4-38. A keystone herbivore is, as reported by the NPS, an animal that "(1) affects the distribution or abundance of many other species, (2) can affect community structure by strongly modifying patterns of relative abundance among competing species, or (3) affects community structure by affecting the abundance of species at multiple trophic levels." Id. This is precisely the role of deer within VFNHP. With this concession, the failure of the NPS to consider the dominant ecological role of deer within the VFNHP in its analysis suggest either an attempt to downplay or disregard its own information or is another example of intentional bias against the deer and in favor of lethal control to rapidly achieve other VFNHP management objectives.

Corr. ID: 1108 **Organization:** Animal Welfare Institute

Comment ID: 93742 **Organization Type:** Conservation/Preservation

Representative Quote: Fundamentally, the NPS fails to consider in its analysis that white-tailed deer are keystone species within any occupied habitat. Consequently, depending on habitat quality and the corresponding number and density of deer, deer will impact ecosystem structure, function, and dynamics. This is not unnatural or inappropriate but, rather, represents an entirely expected outcome when deer are present in an area, particularly when they are the dominant herbivore as is the case in VFNHP. The fact that the VFNHP area has been subject to significant residential and industrial development with a burgeoning human population, complicates deer management by (in most cases) reducing the quality and quantity of habitat for deer outside of VFNHP. The deer can hardly be blamed for adapting to these human-induced changes by seeking refuge and survival within VFNHP.

RESPONSE: Deer are identified as a "keystone" herbivore on page 4-38 of the plan/EIS. This term is used synonymously with keystone species. The plan recognizes that although there are other factors that affect tree regeneration and forest health (e.g., nonnative plants, fire, global warming), deer must be addressed first because they are the dominant factor influencing native plant communities at the park. Definition as a keystone herbivore does not mean that the impacts of deer concentrated at very high densities are in any way "natural" or "appropriate" as described by the commenter. NPS *Management Policies*

2006, Section 4.4.2, states that the NPS will rely on natural processes whenever possible, but may intervene to manage wildlife or plant populations under certain conditions. One such condition is when "a population occurs in an unnaturally high or low concentration as a result of human influences (such as loss of seasonal habitat, the extirpation of predators, the creation of highly productive habitat through agriculture or urban landscapes) and it is not possible to mitigate the effects of the human influences."

The NPS believes that the dominant role of white-tailed deer within ecological systems is recognized throughout the document including the analysis of impacts which is based on the fact that deer are the primary factor influencing native vegetation (and thus other wildlife and wildlife habitat).

WTD4000 - White-tailed Deer Population: Impact of Proposal and Alternatives

CONCERN ID: 19779

CONCERN STATEMENT: Commenters questioned the impact analysis in the plan/DEIS in regards to white-tailed deer, stating it had not proven there would not be unacceptable impacts to the deer population and should have also addressed impacts on individuals, not just the population.

REPRESENTATIVE QUOTE(S): **Corr. ID:** 1108 **Organization:** Animal Welfare Institute

Comment ID: 93804 **Organization Type:** Conservation/Preservation
Representative Quote: In its analysis of the impacts of its proposed action and the other alternatives on the park's white-tailed deer population, the NPS bases its analysis on population impacts. It completely fails to provide any analysis of the impacts of the action/alternatives on individual deer despite a clear requirement to do so as articulated in NPS management policies. This is a significant omission given the potential for cruelty and suffering associated with the proposal to implement a large-scale deer slaughter in the park.

Corr. ID: 1108 **Organization:** Animal Welfare Institute
Comment ID: 93737 **Organization Type:** Conservation/Preservation
Representative Quote: The NPS has not proven that its proposed alternative would not result in unacceptable impacts to the deer population and/or that it won't adversely impact components and processes of the ecosystem that support them.

RESPONSE: Chapter 4: Environmental Consequences, provides a full evaluation of the impacts of implementation of deer management alternatives on the white-tailed deer population, including demographics, condition, population dynamics, behavior, and disease.

NPS *Management Policies 2006*, Section 4.4.1.1, states, "The Service will adopt park resource preservation, development, and use management strategies that are intended to maintain the natural population fluctuations and processes that influence the dynamics of individual plant and animal populations, groups of plant and animal populations, and migratory animal populations in parks." Therefore, except for management of threatened and endangered species where evaluation of impacts on individuals may be appropriate, management actions and evaluation of resource impacts in the NPS generally focus on impacts at the population-level. Impacts described at the population level reflect impacts to individuals that collectively have the potential to result in impacts at the population-level. The NPS believes that the analysis of impacts described in Chapter 4, Impacts on White-tailed Deer Population provides analysis in sufficient detail and at the appropriate scale for the plan/EIS.

WTD6000 - White-tailed Deer Population: Impairment Analysis

CONCERN ID: 19780

CONCERN STATEMENT: One commenter stated that the NPS did not correctly apply the impairment standard when considering the impacts to white-tailed deer, stating that as a native species the

direct and indirect impacts that deer have on their environment cannot be considered impairment.

**REPRESENTATIVE
QUOTE(S):**

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93728

Organization Type: Conservation/Preservation

Representative Quote: Deer are a native species throughout the United States and certainly within VFNHP. As a native species and a species that is a dominant herbivore within occupied range, deer are expected to browse trees and herbaceous vegetation, they may or may not stay within the boundaries of a park for their entire lives, they may be involved in deer-vehicle collisions, and they would have direct and indirect impact on their habitat and other wildlife species. To suggest that such impacts, at a particular subjective level of severity, constitute an impairment is non-sensical and it entirely contradicts the wildlife preservation mandate of the NPS.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93729

Organization Type: Conservation/Preservation

Representative Quote: Because the NPS mistakenly applies the impairment standard to deer impacts within VFNHP, its alternative-specific determinations of impairment are also incorrect. See e.g., Draft EIS, Chapter 4. In this case, the NPS relies on its policy language regarding the impairment standard. Even that language, however, makes clear that the impairment standard is applicable to public use/human actions and not the natural behaviors of native wildlife. Thus, attempting to apply its own impairment policies to assess the alternatives contained in the Draft EIS in regard to the impacts of a native ungulate on forest health, other vegetation, and potential for disease transmission is inconsistent with both the Act and NPS policies.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93719

Organization Type: Conservation/Preservation

Representative Quote: Indeed, though the NPS use of the impairment standard to justify its lethal deer control program is wrong, it could just as easily make an argument that the lack of active management of the park's forests are also impairing forest regeneration.

RESPONSE:

Sections 1.4.4 to 1.4.7 of NPS *Management Policies 2006* provide guidance for the evaluation of potential impacts to park resources. Those sections recognize that the source of the impacts that may lead to impairment can arise from a variety of causes. The guidance does not indicate that impacts leading to impairment could not be caused by a native species. Given the changed conditions both within the park and adjacent to the area, as recognized and described in the document, environmental circumstances have resulted in an over abundance of deer within the park area leading to environmental degradation. *Management Policies 2006* also allow for discretion on the part of the park manager in determining whether or if impairment exists. As noted in *Management Policies 2006*: "Whether an impact meets this definition depends on the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts." A full analysis of impacts is provided in Chapter 4: Environmental Consequences.

Regarding the role of deer in the ecosystem, please refer to the response for Concern ID 19778 (page F-80).

CWD1000 - Chronic Wasting Disease Response Plan

CONCERN ID:

19719

**CONCERN
STATEMENT:**

One commenter stated that the CWD surveillance techniques, as described in the plan/DEIS, are contradictory, and should be reevaluated.

**REPRESENTATIVE
QUOTE(S):**

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93805

Organization Type: Conservation/Preservation

Representative Quote: Statements pertaining to the use of CWD surveillance activities included on page C-14 of the Draft EIS are contradictory. First, the NPS states that live-testing and culling of CWD-positive animals is included as a surveillance technique within Implementation Zone 1 under Alternative B ..." Draft EIS at C-14. In the very next paragraph, the NPS states that "active lethal CWD surveillance is only included in alternatives in the plan/EIS that include lethal reduction methods (Alternatives C and D). Alternative A (no-action) and Alternative B (combined nonlethal actions) described in the plan/EIS do not allow for lethal surveillance methods." Id. This discrepancy must be corrected.

RESPONSE:

Live test and cull is not considered a lethal CWD surveillance method, as defined in Appendix C CWD Response Plan, because deer are removed from the population only after they have tested positive for CWD. Surveillance is a term used to describe efforts to detect the disease and, as suggested by the term "live test", this technique is non-lethal. Therefore, the NPS does not consider use of live test and culling of CWD positive deer as a non-lethal CWD surveillance technique under alternative B (Combined Non-lethal Actions) to be contradictory.

CONCERN ID:

19723

**CONCERN
STATEMENT:**

Commenters questioned the impact analysis between alternatives regarding detection of CWD, and stated that the analysis is misleading. Further, commenters stated that lethal removal of deer does not decrease the potential for CWD to establish itself within a deer population; and that various CWD Response Plans should be prepared for each alternative. One commenter requested information regarding the necessity of integrating a CWD Response Plan within this Plan/DEIS.

**REPRESENTATIVE
QUOTE(S):**

Corr. ID: 960

Organization: *Not Specified*

Comment ID: 93074

Organization Type: Unaffiliated Individual

Representative Quote: CWD response under the various alternatives would differ only if and when a confirmed CWD case occurs within 5 miles of the park boundary or if the park is determined to fall within a state-established CWD containment zone. Further, these differences are misleadingly portrayed as inevitable results of the "necessary" integration of the CWD Response Plan into the plan/EIS. For example, should CWD occur under the no-action alternative (Alternative A), additional actions must be limited to dedicating staff and volunteer time to monitor the park deer for clinical signs of CWD. Not surprisingly, the impacts of this alternative on the risk of disease amplification and likelihood of spread are predicted to be "long-term, major, and adverse." Under the combined nonlethal actions alternative (Alternative B), should the above conditions apply, surveillance would be enhanced using tonsillar biopsy to test live deer. In this case, impacts are predicted to be "long-term, moderate and adverse."

Corr. ID: 960

Organization: *Not Specified*

Comment ID: 93075

Organization Type: Unaffiliated Individual

Representative Quote: Clearly, the NPS intends these dire predictions to cast suspicion on any support for both of the non-lethal alternatives presented. Elsewhere in the plan/EIS we learn that Alternative B is being provided only to "maintain consistency with public input" rather than to be seriously considered, presumably. However, there appears to be no reason why preparing a single CWD Response Plan to be enacted should CWD occur regardless of which alternative is in place prior to its occurrence would be less efficient or more costly than what amounts to preparing three separate response plans. Indeed, this would seem to be the more sensible approach. The requirements of any plan for interacting with healthy deer would be expected to differ greatly from those for interacting with diseased or potentially-diseased deer. Considering these separate cases separately without artificially trying to force a plan designed for one purpose to apply to a very different one would likely result in both plans being more effective.

Corr. ID: 960**Organization:** *Not Specified***Comment ID:** 93076**Organization Type:** Unaffiliated Individual

Representative Quote: While arguing the merits of any such CWD response plan may be premature, it is worth noting that there is no scientific evidence to support the effectiveness of mass slaughter of deer to control CWD. In the 1990s, two attempts to eradicate CWD from cervid research facilities failed most likely due to residual environmental contamination. In fact, slaughtering thousands of healthy deer may only help spread CWD, since many deer are likely to escape slaughter and enter new territories with no previous occurrence of the disease. In contrast, rather than resulting in "long-term, moderate and adverse" impacts on the risk of spread of CWD, the approach described under Alternative B, tonsillar biopsies of live deer which is very similar to that favored by population ecologist Dr. Charles Southwick of the University of Colorado has the advantage that evidence of infection may be detected even before symptoms develop. Also, the "limitations" presented for the non-lethal approach deer initially captured and marked as "treated" with a reproductive control agent would be excluded from CWD testing after the first year; male deer would be excluded from the surveillance effort seem at the very least to assume the use of particular methods for reproductive control and in any case could be obviated with additional effort.

Corr. ID: 960**Organization:** *Not Specified***Comment ID:** 93072**Organization Type:** Unaffiliated Individual

Representative Quote: The plan/EIS presents four alternatives for the National Park Service's (NPS) actions toward the park deer and for its response to chronic wasting disease (CWD). The NPS claims that integration of the CWD Response Plan into the plan/EIS is necessary because planning efficiencies and cost savings are associated with integration. However, no support is offered for this claim. Instead, integration seems completely unnecessary and, as proposed, serves only to support those alternatives that include slaughtering the vast majority of the park deer before any increased "level of readiness" for CWD is even perceived to be needed. Clearly, the NPS favors killing deer as quickly as possible and is misusing the alleged threat of CWD to further that end.

Corr. ID: 1108**Organization:** Animal Welfare Institute**Comment ID:** 93764**Organization Type:** Conservation/Preservation

Representative Quote: While our knowledge of CWD is not complete, there is an abundance of information available in the scientific literature about the disease and its potential impact on deer and other cervids. Indeed, the NPS cannot even declare with certainty that a reduction in the park's deer population will reduce the potential for the spread of CWD if it were detected in or near the park. Not only is there the problem with the persistence of the prion in the environment, but the NPS can only "hypothesize(d)" that increased animal density and increased animal-to-animal contact enhances the transmission and spread of CWD." Draft EIS at C-12. Consequently, decreasing animal densities "may" decrease the transmission and incidence of the disease." Id.

Considering the apparent importance of CWD to the NPS and the fact that CWD in or near VFNHP would trigger, depending on the alternative selected at the conclusion of this planning process, the rapid reduction of the deer population to a density as low as 10 deer per square mile, the NPS was required to provide a far more detailed review of the CWD literature. Such a review would have ensured that the public would be better able to assess the likelihood of a CWD outbreak in park deer, the mechanisms that would permit such an outbreak to occur, and the long-term implications of such an incident.

RESPONSE:

As stated on page 2-14 and C-2 of the plan/EIS, "the direct relationship between the plan/EIS objectives, alternatives, and impact analysis and CWD Response Plan goals, response strategies, and environmental impacts" made integration of the deer management and CWD response plans both feasible and cost-effective. As stated on page 1-2 of the plan/EIS, action in regard to CWD is needed at this time because changes in the proximity of chronic wasting disease to the park boundary and other risk factors have resulted in an elevated risk of chronic wasting disease occurrence within the park.

As stated on page 2-20, in developing deer management alternatives that integrated CWD response, the decision was made to include lethal actions to address CWD only under alternatives that included lethal removal methods (Alternatives C and D). Only non-lethal actions to address CWD were included under alternatives that did not include lethal removal actions (Alternatives A and B). The NPS describes the consequences of excluding active lethal surveillance under Alternative B on pages 2-24 and C-14. Provided that all action alternatives at least partially achieved the plan objectives (see Table 6, page 2-66), this decision was made to maintain consistency with public input received during public scoping which indicated there was strong support for a completely non-lethal deer management alternative. Development of a full range of reasonable alternatives represents different strategies for CWD response. Public comments have been summarized and presented in two comment analysis reports which are available on the park website at <<http://www.nps.gov/vafo/parkmgmt/white-tailed-deer.htm>>.

As stated by one commenter, under alternative A “additional actions must be limited to dedicating staff and volunteer time to monitor the park deer for clinical signs of CWD.” NEPA regulations (40 CFR 1502.14) require consideration of a “no action alternative” that includes the continuation of existing management to provide a baseline for assessing the effects of all “action” alternatives. The no-action alternative (Alternative A) in this plan/EIS is the continuation of the park’s current deer management activities, including continuation of limited CWD surveillance. CWD surveillance actions proposed under this alternative were approved through a separate NEPA process in 2007, and thus are appropriately included under the no action alternative. Inclusion of new actions would not be appropriate under the no action alternative.

Changes in the proximity of chronic wasting disease to the park boundary and other risk factors have resulted in an elevated risk of chronic wasting disease occurrence within the park. Appendix C, CWD Response Plan for Valley Forge NHP has been updated to reflect recently published literature related to the long-term impacts of CWD on population dynamics of mule deer populations (Miller et al. 2008) (page C-2). Please refer to Appendix C: CWD Response Plan for Valley Forge NHP for a full description of the CWD risk assessment completed for the park (see page C-4) which includes the factors that would increase the risk of CWD occurring the park. In regard to the long-term impacts of CWD on deer populations, NPS states on page C-2 that the impacts of CWD on population dynamics of deer and elk are presently unknown” that there is uncertainty associated with the disease, as well as social, economic, and biological threats to the community and the affected species. As described in both the plan/EIS and Appendix C, computer modeling suggests that CWD could substantially reduce infected cervid populations by lowering adult survival rates and destabilizing long-term population dynamics.

As presented on pages C-11 and C-12 of the CWD Response Plan, NPS guidance suggests reducing population numbers as an appropriate management tool when population density is above that identified in park management plans and/or the need to know CWD prevalence with a high degree of accuracy is necessary (NPS 2007c). Use of population reduction as a method for controlling disease in wildlife is based on the premise that infectious disease is a density dependent process (Wobeser 1994). This action is consistent with the Level 1 response described in Pennsylvania’s CWD response plan (PCWDTF 2007). Therefore, the NPS deems this action to be appropriate should CWD be confirmed within 5 miles of the park boundary of the park falls within a state-established CWD containment zone.

GA1000 - Impact Analysis: Impact Analyses

CONCERN ID: 19727

CONCERN STATEMENT: One commenter stated that the NPS has offered no site specific data to suggest that the diversity or abundance of wildlife species in the park has declined due to the impacts of deer. Rather, the NPS uses studies conducted in other areas in Pennsylvania. As a result, the analysis is inadequate.

**REPRESENTATIVE
QUOTE(S):****Corr. ID:** 1108**Organization:** Animal Welfare Institute**Comment ID:** 93778**Organization Type:** Conservation/Preservation

Representative Quote: Though the NPS often cites to studies to substantiate these claims, few of the studies involve VFNWP. For example, the NPS cites a study (deCalesta 1994) from northwestern Pennsylvania that documented a reduction in bird species richness and abundance of 27% and 37%, respectively, for intermediate-canopy-nesting bird species at higher deer densities (presumably referring to 38 and 64 deer per square mile). Draft EIS at 3-27, 4-40. While that study may be perfectly legitimate, it has little to do with VFNHP and whether deer populations in the park are causing similar impacts. Moreover, though some studies have documented a decline in eastern chipmunks, gray squirrel, and white-footed mice as a result of competition with deer for mast crops, Draft EIS at 3-27, 4-41, there's no evidence offered that such impacts are occurring in VFNHP. Nor does the NPS provide any VFNHP-specific data to demonstrate that nonnative species are adversely affecting the native biota. Instead, again, the NPS relies on other studies conducted elsewhere to speculate about such impacts. Frankly, even the NPS claim that deer browsing is adversely impacted the least prevalent bird species is entirely speculative since it has offered no historic data to suggest that said species were more abundant in the park anytime in the past.

Corr. ID: 1108**Organization:** Animal Welfare Institute**Comment ID:** 93776**Organization Type:** Conservation/Preservation

Representative Quote: Though 29 species of reptiles and amphibians were found in the park as a result of surveys, the NPS offers no evidence that any of these species are currently being adversely impacted or are likely to be adversely impacted by deer. Draft EIS at 3-26.

Similarly, of the five-state listed animal species, only one, the red-bellied turtle, is considered a park resident and no evidence is offered to suggest that deer are adversely impacting this species. Draft EIS at 3-26.

Corr. ID: 1108**Organization:** Animal Welfare Institute**Comment ID:** 93777**Organization Type:** Conservation/Preservation

Representative Quote: With the exception of identifying three ground-nesting bird species that have been determined to be least prevalent in VFNHP, the NPS has offered no other compelling data to suggest that the diversity or abundance of wildlife species in the park has declined due to the impacts of deer. Instead, the NPS relies on statements of concern to try to prove its point. For example, it claims that the removal of forest understory vegetation leads to a decline in food, cover, and nesting sites for forest bird communities and some insect communities. Draft EIS at 3-27. In addition, the NPS states that densities of the black-billed cuckoo, hooded warbler, and white-eyed vireo will remain low within the park unless the herbaceous and shrub layers are restored. Id., 4-40. It goes on to claim that the loss of native nectar plants in both forests and grasslands may especially impact butterflies and other pollinators, id., and that the loss of the forest understory may affect woodland birds (migratory and resident) and other species that require ground cover to maintain viable populations (box turtles, American toads, gray tree frogs, hognose snakes) most seriously. Draft EIS at 4-40. Yet, the NPS offers not a single shred of evidence to actually demonstrate that such impacts are occurring in VFNHP.

Corr. ID: 1108**Organization:** Animal Welfare Institute**Comment ID:** 93774**Organization Type:** Conservation/Preservation

Representative Quote: For small mammals, the NPS offers not evidence to suggest that any mammal species has declined as a result of deer presence and browsing within VFNHP. Instead, relying on a series of other studies conducted in other places, it suggests that such impacts are possible.

RESPONSE:

Information on the impacts of deer on other native wildlife is provided as background information and as a basis for evaluation of impacts as described in Section 4.3.3 (page 4-37). The evaluation of wildlife (other than deer) and wildlife habitat was based on a qualitative assessment of how expected changes to park vegetation, as described in section 4.1.1, would affect the abundance and diversity wildlife populations. Change in the quality and quantity of forage, availability of suitable nesting sites, amount of cover, and level of competition for existing resources may lead to significant changes in the size, reproductive success, rate of predation, and mortality rate for wildlife populations.

As stated in *NPS Management Policies 2006*, Section 4.1, "decisions about the extent and degree of management actions taken to protect or restore park ecosystems or their components will be based on...management objectives and the best scientific information available." This information may be obtained through "consultation with technical experts, literature review, inventory, monitoring, or research to evaluate the identified need for management..." (*NPS Management Policies 2006*, Section 4.4.2.1). Information provided on the impacts of white-tailed deer on other wildlife species is based on referenced scientific literature that the NPS believes is sufficient to assess the likely effects of deer on these species. Please also refer to response to Concern ID 19748 on page F-25.

As indicated in the plan/EIS objectives on page 1-3, the purpose of the plan/EIS is to develop a deer management strategy to promote the protection, preservation, and restoration of native vegetation and other natural and cultural resources. Tree regeneration has been selected as the metric used to evaluate plan success rather than wildlife diversity or abundance. It is through the protection and restoration of native plant communities and thus wildlife habitat that the NPS proposes to protect and preserve other native wildlife species. This is considered to be the most practical approach given the wide range of variables outside park boundaries that may influence these species (e.g., migratory species) and is consistent with *NPS Management Policies* (Section 4.4.1.1).

Data used to support the need for action (deer population size and forest vegetation) is long-term, park-specific, and collected using sound scientific methods as described on pages 1-14 through 1-17, 3-9, 3-10, and 3-13 to 3-20. In addition to presenting information based on park-specific data, other information presented in the plan/EIS related to deer and vegetation is supported by data collected throughout Pennsylvania and published in referenced scientific literature. As stated on page 3-10, in Pennsylvania forests, abundant deer populations have impeded the establishment and growth of sufficient tree seedlings to regenerate forests and researchers describe the regeneration problem as "ubiquitous rather than specific to a particular region, owner, or forest type." The tree regeneration threshold for Valley Forge NPS is based on the standard adopted state-wide by the Pennsylvania Regeneration Study for adequate regeneration (see page 2-2). NPS believes data used in the plan/EIS is sufficient to justify plan/EIS purpose, need for action, objectives, and supporting analysis.

CONCERN ID:

19855

CONCERN STATEMENT:

One commenter stated that while the plan/DEIS reviews deer management actions in different locations within Pennsylvania, the results of these actions as it relates to achieving the objectives should also be provided, if available.

REPRESENTATIVE QUOTE(S):**Corr. ID:** 1131**Organization:** Cummings School of Veterinary Medicine, Tufts University**Comment ID:** 93262**Organization Type:** University/Professional Society

Representative Quote: The DEIS reviews deer management actions taken in other jurisdictions in Pennsylvania (1-18 to 1-23). It describes actions taken and gives some information on harvests, but it provides no information on whether any of the actions have achieved deer population management, vegetation regeneration, or other management goals. If such data are available, they should be provided. If not, caveat emptor.

RESPONSE: The plan/EIS has been updated to include any known information on objectives for management and success in achieving those objectives. Please refer to pages 1-19 and 1-21.

GA3000 - Impact Analysis: General Methodology For Establishing Impacts/Effects

CONCERN ID: 19729

CONCERN STATEMENT: One commenter asked how frequently the methodology for implementing safety controls would be evaluated.

REPRESENTATIVE QUOTE(S): **Corr. ID:** 1096 **Organization:** *Not Specified*

Comment ID: 93531 **Organization Type:** Unaffiliated Individual

Representative Quote: Question based on evaluation of results of methods-does the methodology get evaluated periodically?

How often?

RESPONSE: The adaptive management process, described on page 2-46 of the plan, would not only be used to evaluate the impacts of the proposed, but also the manner in which the actions are implemented. This includes how staff and visitor safety is protected. The NPS would continually monitor employee and visitor safety during implementation, immediately address safety issues that arise, and improve safety conditions on an on-going basis through adaptive management. Additionally, the NPS would continue to gather data from similar actions at other locations to promote anticipation of future safety issues which could be addressed prior to implementation of selected actions (e.g., reproductive control).

CONCERN ID: 19732

CONCERN STATEMENT: One commenter was concerned about the use of adaptive management in the plan, specifically that based on vegetation monitoring data, it could only occur every five years at a minimum.

REPRESENTATIVE QUOTE(S): **Corr. ID:** 1108 **Organization:** Animal Welfare Institute

Comment ID: 93793 **Organization Type:** Conservation/Preservation

Representative Quote: In this case, VFNHP claims that it will rely on adaptive management to modify its management plan as new information, monitoring data results, and other evidence is collected. Inexplicably, instead of establishing an adaptive management approach that would routinely consider the new evidence/information and adapt the plan accordingly, the NPS is proposing to only engage in such adaptive adjustments on a periodic basis. Vegetation recovery monitoring would only occur every five years, Draft EIS at 2-41, and, thus, adaptation of the plan as a result of vegetation monitoring data could only occur every five years at a minimum.

RESPONSE: All levels of the Department of the Interior are committed to maintaining the adaptive management process in all aspects of resource management (Williams et al 2007).

As described in Appendix A, monitoring data are collected for a subset of plots on an annual basis and this data is summarized over all plots every 5 years. Data collected annually would provide interim information on progress toward achieving the desired level of tree regeneration. However, there could be significant fluctuations in these data as a result of stochastic events such as drought. Therefore, the NPS believes that management actions are appropriately evaluated based on data summarized over a 5 year period. This information would be used to adaptively manage actions taken by the NPS. Adaptive management is fully described in the plan/EIS in Section 2.9: Adaptive Management Approaches Included in the Action Alternatives.

CONCERN ID: 19858

CONCERN STATEMENT: One commenter was concerned about using compartment counts, the sighting index of 0.58, and spotlight counts to estimate the deer population. The commenter stated that the sighting index of 0.58 is outdated and a new sighting index should be established, and that spotlight counts are inaccurate. Another commenter also stated that the initial target density goal is too high, and that the park should measure deer density in terms of deer per square wooded mile, thus lowering the deer density target to 10 deer per square wooded mile. One commenter went further and stated concerns regarding the park's purported lack of deer birthrate information, as well as the estimated population trend which predicts the deer population to continue to increase, while current data indicates that it has decreased in recent years.

REPRESENTATIVE QUOTE(S):

Corr. ID: 506 **Organization:** Friends of Animals, Inc.

Comment ID: 93321 **Organization Type:** Conservation/Preservation

Representative Quote: The natural reduction and stabilization of this deer population since 2005 challenges the key premise of the Plan/EIS -- that the numbers of deer living in this community need to be reduced.

Corr. ID: 961 **Organization:** *Not Specified*

Comment ID: 93081 **Organization Type:** Unaffiliated Individual

Representative Quote: I give a few examples of misleading or mistaken information or lack of information. You admit that you do not even know the birthrate an essential factor for intelligently controlling deer populations-- for deer in the park. (3-19) Then you admit that you "assume" the birthrate is "similar to those populations in areas surrounding the park" (3-19) You neglect to state whether these other areas are hunted. This information is essential for research has shown that deer in hunted areas reproduce more than herds that are not hunted. If hunting or culling reduces the density of the herd, reproduction increases. These differences were reported as early as 1950 (Cowan, 1950; Chaetum and Severinghouse 1950; Scheffer 1951 as quoted in Putman, Rory, 1988, The Natural History of Deer, 113). Thus, your lack of knowledge concerning the birthrate reveals an important deficiency.

The draft plan then states that "based on ongoing population surveys the deer population has increased, and in the absence of any population management measures, this trend is expected to continue over time, with some fluctuation due to weather and other factors." (My emphasis, 3-19). In fact, however, using your own figures, the deer herd has decreased from a high of 1,398 in 2003 to 1,023 in 2007 thus your figures show the deer herd is decreasing, not increasing. A 375 decrease in population is hardly a mere fluctuation. Why no count for 2008? Was there a further decrease?

Corr. ID: 1018 **Organization:** Valley Forge Citizens for Deer Control

Comment ID: 92449 **Organization Type:** Conservation/Preservation

Representative Quote: However, we think that the initial goal for deer reduction is much too high. The goal should at least match the 10 deer per sq. mi. goal, or 50 deer, where in the EIS chronic wasting disease is within five (5) miles of the Park. In support of the lower target, as recently as 2005 the Pennsylvania Game Commission published a state-wide target goal of five (5) deer per wooded sq. mi. From a scientific standpoint, a USDA study from 1980 to 1990 of deer damage occurring in the Allegheny National Forest concluded that the number of tree species begins to decline as deer density exceeds 10 deer per wooded sq. mi., a finding which has been agreed with by a number of wildlife biologists.

Corr. ID: 1108 **Organization:** Animal Welfare Institute

Comment ID: 93744 **Organization Type:** Conservation/Preservation

Representative Quote: The NPS claims that the VFNHP deer population density exceeds 193 deer per square mile. Draft EIS at vi, 1-13. Though this density is so large to

appear impossible, this is actually lower than the estimated density of deer in the park only a few years ago. These densities and the associated population estimates are a product of two different deer survey tools used at VFNHP (i.e., spotlight counts in the fall, and spring compartment counts) (Draft EIS at A-1, A-2). These survey tools are the primary methods used by the NPS to determine trends in deer abundance and assess changes in deer population size over time. Draft EIS at vi. Based on the survey results, the NPS claims that, on average, the deer population has increased about 10% each year with significant fluctuations occurring after 1996 (Draft EIS at 1-14, 3-12) with the actual population size increasing from an estimated 772 to 1,023 individuals between 1997 and 2007. A maximum count of deer was recorded in 2003 (1,398 deer). Draft EIS at 1-14, 3-12. Spotlight counts are notoriously inaccurate and, therefore, such data is, at best, only possibly indicative of population trend.

Corr. ID: 1108

Organization: Animal Welfare Institute

Comment ID: 93745

Organization Type: Conservation/Preservation

Representative Quote: Spring compartment counts involve the simultaneous counting of deer in five compartments designated within and outside of VFNHP. The total number of deer observed is then multiplied by a sighting index of 0.58 which ostensibly represents the proportion of the population not observed during counts to generate an estimate of the deer population size within the park. Draft EIS at 1-14, A-2.

This sighting index was calculated based a mark-recapture methodology used when spring compartment counts were first initiated in the park. At that time, a number of deer were captured and marked and, in subsequent counts, the number of marked animals was noted. Based on this count, Lovallo and Tzilkowski (2003), determined that a sighting index of 0.58 was needed to correct for deer not seen during the counts. In other words, 58 percent of marked deer were not observed in subsequent counts. There are several problems with the calculation and use of this sighting index.

Of particular concern is the reliability of the sighting index. Though the original sighting index was based on a mark-recapture methodology, the Draft EIS suggests that observers participating in spring compartment counts should indicate if a marked deer is observed during the survey. Draft EIS at A-3. Considering that the original mark-recapture research was done years ago, it is unclear if whatever markers were used then are still in place. If not, then the 0.58 sighting index is based on old data and may no longer be relevant. Indeed, considering the significant decline in the number of deer observed during fall spotlight surveys from 2002 to 2007, continuing to use an old sighting index to estimate the park's deer population size is likely producing significant overestimates. If this methodology is to be used in the future, a new sighting index must be established annually or, at a minimum, biannually to improve the accuracy of the population estimates.

RESPONSE:

Spotlight count data is presented solely as background data reflecting general trends in deer abundance (growth) for the park and would not be used to estimate population size. Changes in park meadows as a result of changes in the mowing regime (described below) and the recent occurrence and spread of sand blackberry (proposed for state-listing as endangered) has been noted by park staff conducting spotlight counts as interfering with the ability to see deer. The downward trend in the number of deer observed during these counts over the last several years is likely attributed to these factors. This information is still considered of interest because it represents the data with the longest period of record (from 1986).

Spring compartment counts using protocols established by Lovallo and Tzilkowski (2003) have been used to estimate deer population size since 1997. Deer population size is estimated based on the total number of deer observed across all count areas divided by a sighting index (0.58) which represents the proportion of the population not observed during counts. While this is a standard method for estimating population size (Conroy and Nichols 1996), it may become less accurate over time as park vegetation changes and deer potentially become more or less visible. It should be noted that when the sighting

index could be said to be 'most' accurate in 1999, the population density was 5 times higher than the target deer density goal to promote adequate tree regeneration.

This index is still considered to be relatively accurate for the purposes of estimating deer population size at the park. Since development of the sighting index in 1997-1999, the amount and distribution of existing land cover types in the park has not changed (e.g., forest, field, developed land). With the exception of winter 2004-2006, all fields have been mowed annually ensuring standard visibility across years. Between 2004-2006, 0-25% of fields were mowed annually and this temporary change in management potentially reduced the ability of park staff to observe deer, resulting in lower population counts during spring 2005, 2006, and 2007. A return to field mowing in 2008 and 2009 reveal a continued increase in deer population size. Forested habitat has potentially become more open, potentially leading to an increased ability to observe deer during spring counts. Therefore, it could be concluded that reported population size should be considered a minimum number. The sighting index would be re-evaluated if deer management actions involving marking of individual deer (e.g., reproductive control) are implemented.

Deer per square mile or per square kilometer is a standard unit for reporting deer densities and allows comparison with data reported in published literature and promotes easy understanding by the general public.

The level of tree regeneration is the metric selected to measure plan success. Within the scientific literature recommended deer density ranges from 10 to 40 deer per square mile to ensure adequate tree regeneration. The initial target deer density of 31-35 deer per square mile was selected because it represents a density within the recommended range for which the park has specific data documenting that, at this deer density, forest health was "excellent" (Cypher et al. 1985). This number also reflects the availability of alternative forage sources for deer such as significant areas of grassland in the park. The availability of alternate forage may allow tree regeneration to occur at slightly higher deer densities (30-40 deer per square mile) compared to heavily forested sites.

Through the adaptive management process the park would monitor both regeneration and deer density to determine whether the number of deer removed is sufficient to achieve plan objectives. Should achievement of the initial target deer density be insufficient to promote the desired level of tree regeneration then the target deer density would be re-evaluated.

Regarding information on deer reproductive rate specific to deer within the park, the NPS states on page 3-20 that the current reproductive rate of white-tailed deer in the park is unknown. In fall 1984, the fawn to: doe ratio in the park was reported as minimally 1.13 fawns per doe, similar to that reported in surrounding Montgomery and Chester Counties (Cypher et al. 1985). The NPS does not consider it unreasonable to assume reproductive rates of the deer population in 2009, are similar to those in Wildlife Management Unit 5C (as defined by the Pennsylvania Game Commission) which includes the park and represents deer potentially harvested on lands immediately adjacent to the park. The NPS considers this data sufficient both for the development of alternatives and evaluation of impacts.

As stated on page 2-42, basic biological information and information needed to refine the accuracy of the population model would be collected for as many deer as possible during processing of carcasses under alternatives C and D. Monitoring of reproductive rate is also proposed under Alternative B (see page 2-34). When possible, information related to reproductive rate (number of fetuses per doe) would be collected as described on page 2-34 and Appendix A: Deer and Vegetation Monitoring Protocol.

CONCERN ID:
CONCERN
STATEMENT:

19915

One commenter questioned the assumption that 80% of the deer would be removed, with one commenter asking if this would be enough.

REPRESENTATIVE QUOTE(S): **Corr. ID:** 956 **Organization:** *Not Specified*
Comment ID: 93686 **Organization Type:** Unaffiliated Individual
Representative Quote: And why must *80%* of the deer be eradicated?

RESPONSE: See response to GA1000-Impact Analysis: Impact Analyses, Concern ID 19855 (page F-88).

CONCERN ID: 19916
CONCERN STATEMENT: One commenter questioned the impact analysis and the omission of the intensity of an impact (i.e., negligible, minor, moderate, major) for some of the findings.

REPRESENTATIVE QUOTE(S): **Corr. ID:** 1108 **Organization:** Animal Welfare Institute
Comment ID: 93806 **Organization Type:** Conservation/Preservation
Representative Quote: Throughout Chapter 4 of the Draft EIS the NPS frequently neglects to assign a particular threshold category to the impacts of a particular action. For example, in regard to Alternative C and its impact on deer reproductive rates, the NPS claims that those impacts are long-term and beneficial. Draft EIS at 4-35. Yet it failed to assign an impact category (i.e., negligible, minor, moderate, major) to this finding. This same omission was made in regard to the overall impacts of Alternative C, Draft EIS at 4-36, the cumulative impacts of Alternative C, id., the overall impacts of Alternative D, id., and throughout the remainder of the document. Interestingly (and perhaps suspiciously), the omission of impact thresholds are consistently found in regard to Alternative C and D but not Alternative A and B.

RESPONSE: As stated under Impact Thresholds on page 4-3 of the plan/EIS, in all cases impact thresholds are defined for adverse impacts; however, impact thresholds are not assigned to beneficial impacts. Therefore, if the overall impacts were assessed as beneficial, then they would not be described in terms of negligible, minor, moderate, or major.

ON1000 - Other NEPA Issues: General Comments

CONCERN ID: 19740
CONCERN STATEMENT: One commenter stated that the NEPA process was flawed, feeling that it did not disclose all relevant information, including climate data and trends. Because of this, they stated that the plan/DEIS be withdrawn and a new process initiated.

REPRESENTATIVE QUOTE(S): **Corr. ID:** 1108 **Organization:** Animal Welfare Institute
Comment ID: 93762 **Organization Type:** Conservation/Preservation
Representative Quote: NEPA requires that agencies disclose all information relevant to its analysis of the environmental impacts of its actions. In this case, in regard to climatic data and trends for the VFNHP area, the NPS failed to meet this burden.

Corr. ID: 1108 **Organization:** Animal Welfare Institute
Comment ID: 93814 **Organization Type:** Conservation/Preservation
Representative Quote: For all of the reasons articulated above, the NPS must, preferably, withdraw the Draft EIS and, if necessary, initiate a new, objective planning process that is fully consistent with federal law. If the NPS elects not to follow this advice, then it must select either Alternative A or B. The selection of either Alternative C or D will not only result in an unnecessary and unjustified large scale slaughter of park deer, but it will violate federal law.

RESPONSE: The NPS has met its obligations under NEPA, used the best available data on climate, evaluated climate change to the extent possible and fully disclosed the results of the evaluation, as previously outlined in the response to Concern ID 19747 (page F-23).

The NPS, Vital Signs Monitoring program has selected climate change for long-term monitoring within parks of the Mid-Atlantic Network, including Valley Forge National Historical Park. Through this program, concise climate summaries would be provided on a regular basis with patterns and trends evaluated in an appropriate historical, regional and global context. This information would be used to inform the deer management plan through the adaptive management process described in Section 2.9.

Currently, the NPS Vital Signs Monitoring Program is in the process of completing the first report on climate in parks of the Mid-Atlantic Network. A report detailing the results for Valley Forge NHP would be posted at <http://science.nature.nps.gov/im/units/midn/> when it is available.

CONCERN ID: 19742

CONCERN STATEMENT: Commenters requested that the NEPA process include an extension of the comment period on the plan/DEIS, stating that it had done this for previous planning documents within the park.

REPRESENTATIVE QUOTE(S): **Corr. ID:** 1108 **Organization:** Animal Welfare Institute

Comment ID: 93704 **Organization Type:** Conservation/Preservation

Representative Quote: In addition, the fact that the NPS has received over 500 public comments already on the Draft EIS is irrelevant. AWI predicts that the majority of those comments are generic, form letter and that the number of substantive comments received by the NPS is small. For these reasons, AWI again asks the NPS to consider reopening the comment period on the Draft EIS for an additional 30 days.

Corr. ID: 1108 **Organization:** Animal Welfare Institute

Comment ID: 93703 **Organization Type:** Conservation/Preservation

Representative Quote: As a preface to specific comments on the legal and scientific inadequacies inherent to the Draft EIS, AWI must protest the decision by the NPS not to extend the deadline for public comment on this document. AWI and The Humane Society of the United States submitted a letter, dated February 13, 2009, seeking a 30-day extension in the comment deadline. The letter provided a number of justifications for the requested extension. In its reply, also dated, February 13, the NPS denied this request claiming that the 60-day comment period is standard and because the NPS had already received over 500 public comments.

Neither of these arguments withstands even minimal scrutiny. While a 60-day comment period may be a standard that agencies rely on when seeking public participation in a Draft EIS planning process, many agencies, including the NPS, recognizing that public participation is "essential" to the NEPA process provide additional time for the public to review, analyze, and prepare substantive comments in response to draft impact statements. Even the VFNHP has been willing to provide far more time for public comment on its previous draft planning documents. For example, it provided over 150 days for the public to submit comments on its Draft General Management Plan and EIS. GMP/EIS/RoD at 12. Yet, when asked to provide an additional 30 days for the public to comment on the Draft EIS a document that includes a preferred action that would result in a massive slaughter of native deer it says no. This is yet another example of the bias of the NPS against deer.

RESPONSE: The Valley Forge NHP plan/EIS was open for public review for the required 60 days, per the NPS Director's Order 12 handbook. Valley Forge NHP has always followed the legal and NPS policy requirements for public review on all of its documents. During the public review of the park's General Management Plan/ Environmental Impact Statement, there was some confusion with the publishing of the Notice of Availability which led many to believe that the park had extended the review period. However, this mistake was corrected and the document was made available for the legally required 60 days.

CC1000 - Consultation and Coordination: General Comments

CONCERN ID: 19716
CONCERN STATEMENT: Commenters stated that collaborations with entities outside of the federal government could facilitate non-lethal actions that would increase efficiency of the plan.

REPRESENTATIVE QUOTE(S): **Corr. ID:** 506 **Organization:** Friends of Animals, Inc.

Comment ID: 93329 **Organization Type:** Conservation/Preservation
Representative Quote: But the Parks officials need to undertake what their own Plan/EIS logically instructs: diligent collaborations with appropriate parties regarding alternatives to reduce traffic pressure, such as expanding the schedule of the local SEPTA train, and offering more attractive bus services. Traffic directly impacts the atmosphere, the ozone, and the vegetation of the park; and its effects will be exacerbated by road construction plans.

Corr. ID: 699 **Organization:** Friends of Animals
Comment ID: 93648 **Organization Type:** Conservation/Preservation
Representative Quote: Collaborations with outside parties (e.g. the state government, Jenkins Arboretum, local landowners, volunteers to remove introduced vegetation) could also reduce the concentration of deer, ease traffic-related tensions, and collaborate in ensuring native plants and birds thrive in the region.

Corr. ID: 1108 **Organization:** Animal Welfare Institute
Comment ID: 93697 **Organization Type:** Conservation/Preservation
Representative Quote: Ultimately, given the multiple legal deficiencies inherent in the Draft EIS, the NPS would be well advised to withdraw the Draft EIS, establish an advisory committee to engage in further discussions about deer management, to identify studies that should be undertaken in VFNHP, and to develop a comprehensive and effective non-lethal management plan to address many (and perhaps all) of the concerns of NPS biologists/scientists and of residents who live near VFNHP in regard to deer impacts on vegetation, forest regeneration, cultural resources, archeological resources, public safety, visitor use, special status species, and park operations. AWI would be pleased to provide a representative to serve on this committee if provided the opportunity.

Corr. ID: 1108 **Organization:** Animal Welfare Institute
Comment ID: 93702 **Organization Type:** Conservation/Preservation
Representative Quote: Establishing an advisory committee and directing that committee to rapidly find an effective non-lethal alternative to humanely manage the VFNHP deer population could set a precedent that could be employed in other parks when or where needed. Admittedly, such a management strategy may not involve active management (i.e., not be entirely consistent with the concept of "natural regulation") but, as evidenced by the situation in VFNHP and the rapid development of its surrounding lands, "natural" conditions are no longer entirely relevant in VFNHP and other suburban units within the national park system. This is not justification to initiate a wide-scale deer killing program, rather it demonstrates the need for a more holistic and comprehensive non-lethal management plan.

RESPONSE: The NPS has been involved in discussions and collaborations related to issues involving white-tailed deer for over two decades. Development of the plan/EIS involved extensive involvement of both the public and others as required by NEPA. As described in Chapter 5: Consultation and Coordination, the NPS divides the scoping process into two parts: internal scoping and external or public scoping. Internal scoping involves discussions among NPS personnel regarding the purpose of and need for management actions, issues, management alternatives, mitigation measures, the analysis boundary, appropriate levels of documentation, available references and guidance, early contact with other federal, state, and local agencies and Indian tribes as appropriate. Public scoping is the early

involvement of the interested and affected public in the environmental analysis process. This helps to ensure that people have an opportunity to comment and contribute early in the decision-making process. For this plan/EIS, project information was distributed to individuals, agencies, and organizations at the initiation of the scoping process, and the public was given the opportunity to express concerns or views and to identify important issues or suggest other alternatives. The Draft plan/EIS was available for a 60-day public comment period between December and February 2009. Public meetings were held to present the plan and solicit comments from the public were held in January 2009. Please refer to Chapter 5 for more detailed information on the internal and public scoping conducted as part of plan/EIS development.

Two science teams, consisting of scientists and other specialists from a variety of state and federal government organizations assisted with the planning process by: evaluating scientific literature and research on the topics of deer management and CWD; reviewing and recommending monitoring protocols for park deer populations and other park resources; and identifying appropriate action thresholds at which deer management strategies would be implemented. Please refer to page 1-29 and 5-2. Members of science teams are provided in References: Planning Team, Contributors, and Consultants section of the plan/EIS. Additionally, an independent review of Appendix E Review of White-tailed Deer Reproductive Control was conducted in January 2009. Comments were received from Dr. Jay Kirkpatrick and Dr. Allen Rutberg, both well respected researchers in the field of wildlife reproduction and contraception. Other non-lethal actions that were considered and are described in Section 2.10: Options Considered but Rejected (see page 2-50).

The park actively works with state and local government on issues of traffic congestion and land use outside federal lands. Those jurisdictions, rather than the NPS, have the authority to make decisions, however.

The NPS The NPS believes that it has developed and presented an adequate range of alternatives within the plan/EIS to satisfy the purpose, need, and objectives of the plan and has conducted adequate internal and external scoping as is required by NEPA.

CONCERN ID: 19718

CONCERN STATEMENT: One commenter was concerned with the selection of the science team members, and further stated that composition of the first science team (the deer team) was not provided in the plan/DEIS.

REPRESENTATIVE QUOTES(S): **Corr. ID:** 1108

Organization: Animal Welfare Institute

Comment ID: 93792

Organization Type: Conservation/Preservation

Representative Quote: The Draft EIS reports that the NPS relied on two science teams while preparing the document. The first team included regional and national experts on forest regeneration, vegetation management, wildlife management, and individuals with specific experience in deer management. Draft EIS at x. The second team was composed of regional and national wildlife management experts from the NPS and PGC with knowledge about CWD. Draft EIS at xi, 1-27. The Draft EIS claims that the composition of both teams is reported in the Draft EIS. While the composition of the second team (the CWD team) was included in Table C-1 of the Draft EIS. Draft EIS at C-3. The composition of the first team (the deer team) was not disclosed in the Draft EIS. Moreover, in regard to the composition of the CWD team, with the exception of the wildlife veterinarian, it is not clear that any of the participants have any specialized knowledge about CWD.

RESPONSE:

Science team members are provided in References: Planning Team, Contributors, and Consultants in the plan/EIS. The CWD science team is considered an interdisciplinary team with membership not solely based on knowledge related to CWD. Membership of the CWD science team represents expertise related to the following areas considered critical to the development of recommendations regarding CWD response: CWD

biology, CWD management in Pennsylvania, NPS policy and regulations, park operations, status of CWD management and planning in other NPS units, and white-tailed deer ecology and management. Experts on CWD were Jenny Powers, NPS Wildlife Veterinarian and Dr. Walter Cottrell, PGC Wildlife Veterinarian. Ms. Powers is the primary author of "A National Park Service Manager's Reference Notebook to Understanding Chronic Wasting Disease" (NPS 2009) and has responsibility for providing updated information on CWD to NPS units. Dr. Cottrell is the primary contributor to the Pennsylvania Chronic Wasting Disease Response Plan (2007) for the Pennsylvania Game Commission and is responsible for coordination of CWD monitoring throughout the state.

Original Correspondence Submitted by Government Agencies



THE COUNTY OF CHESTER

COMMISSIONERS

Carol Aichele
Terence Farrell
Kathi Cozzone

RONALD T. BAILEY, AICP
Executive Director

PLANNING COMMISSION

Government Services Center, Suite 270
601 Westtown Road
P.O. Box 2747
West Chester, PA 19380-0990
(610) 344-6285 Fax: (610) 344-6515



January 16, 2008

Michael Caldwell, Superintendent
Valley Forge National Historic Park
1400 North Outer Line Drive
King of Prussia, PA 19406-1009

Re: Draft Deer Management Plan

Dear Mr. Caldwell:

On January 5, 2009, your office submitted a letter to the Planning Commission requesting our review and comment of the *Draft White-tailed Deer Management Plan/Environmental Impact Statement* for Valley Forge National Historic Park (NHP), dated December 2008. This is a timely document given the ecological degradation and vector disease concerns associated with unnaturally dense populations of white-tailed deer. Upon review of the four alternatives described in the document, we find the Alternative D "Combine Lethal and Non-lethal Actions," is most consistent with the adopted elements of the Chester County Comprehensive plan.

Alternative D is consistent with *Landscapes*, the Policy Element of the Chester County Comprehensive Plan, and helps to implement the following policies:

- 2.1.10 Preserve and manage large woodland areas for their wildlife habitat and scenic values and their contributions to groundwater recharge, improved air quality, and erosion control.
- 9.1.3. Provide public health intervention, surveillance, and education programs to decrease incidence of chronic and communicable diseases in Chester County.

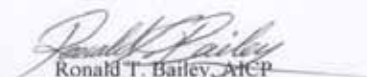
Alternative D is also consistent with *Linking Landscapes*, the Open Space Element of the Chester County Comprehensive Plan, and helps to implement the following Vision Item:

- 5.4 Over populated game species should be controlled through hunting, culling, or in parts of the County where hunting and culling is not practical, non-lethal means that have been documented through multiple case studies to be effective, feasible and cost efficient.

Page: 2
January 16, 2009
Re: Draft Deer Management Plan

Thank you for undertaking this effort to improve diversity of the natural ecosystems in Chester County.
If you have any questions please contact Jake Michael at 610-344-6503.

Sincerely,


Ronald T. Bailey, AtCP
Executive Director

RTB/JM/yg
cc: Mimi Gleason, Manager Treddyfrin Township
Kristina Heister, Natural Resources Manager, Valley Forge NHP
John Mikowychock, CCPRD
Jake Michael, CCPC



LOWER PROVIDENCE TOWNSHIP

100 Parklane Drive • Eagleville, PA 19403 • www.lowerprovidence.org

Administration: 610-539-8020 • Fax: 610-539-6347

Police: 610-539-5900 • Fax: 610-630-2219



January 21, 2009

Michael A. Caldwell, Superintendent
Valley Forge National Historic Park
1400 North Outer Line Drive
King of Prussia, PA 19406-1009

RE: White-tailed Deer Management Plan

Dear Mr. Caldwell:

Thank you for providing Lower Providence Township the opportunity to review the draft White-tailed Deer Management Plan/Environmental Impact Statement for Valley Forge National Historical Park. The Township is fortunate to be a neighbor to this national treasure and values its relationship with the Park.

After reviewing the draft plan, staff at the Township concurs with the option preferred by the National Park Service and supports Alternative D. A balance of both lethal and non-lethal actions is an agreeable method for managing the deer population and protecting the natural landscape. We appreciate the sustained efforts of the Park Service to ensure visitors will continue to enjoy the Park's abundance of historical resources and are grateful, also, for its preservation of fauna and flora in an ever-developing community.

Lower Providence Township supports the efforts to fully develop the Plan's Alternative D and looks forward to its realization.

Sincerely,

A blue ink signature of Nathaniel J. Dysard.

Nathaniel J. Dysard
Project Analyst

Cc: Lower Providence Township Board of Supervisors
Joseph C. Dunbar, C.P.M., Township Manager



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

February 12, 2009

Ms. Kristina Heister, Natural Resource Manager
Valley Forge National Historical Park
1400 North Outer Line Drive
King of Prussia, PA 19406

Subject: Draft White-tailed Deer Management Plan/Environmental Impact Statement Valley Forge National Historical Park King of Prussia, PA December 2008 CEQ # 20080519

Dear Ms. Heister:

In accordance with the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act, the United States Environmental Protection Agency (EPA) has reviewed the subject document. The purpose of the Draft Environmental Impact Statement (DEIS) is to develop a deer management plan that supports protection, preservation, and restoration of native vegetation and other natural and cultural resources throughout and beyond the life of this Plan/DEIS. The purpose of the Plan/DEIS also is to provide appropriate response to chronic wasting disease at Valley Forge NHP. The DEIS states that there are approximately 193 deer per square mile in the park. The deer density goal is 31-35 deer per square mile.

The preferred Alternative is Alternative D, Combined Lethal and Nonlethal Actions. Initially this alternative would use lethal reduction via sharpshooting and capture/euthanasia to quickly reduce the deer population and achieve the initial deer density goal. Population maintenance would be conducted via reproductive control when an acceptable agent becomes available. Until an acceptable and effective reproductive control agent becomes available, population maintenance would be conducted using lethal methods.

Based on our review we rate this DEIS, Lack of Objections (LO). A description of our rating system can be found at: <http://www.epa.gov/compliance/nepa/comments/ratings.html>. Thank you for the opportunity to offer these comments. If you have any questions, please contact me at (215)814-3330.

Sincerely,

A handwritten signature in dark ink, appearing to read "Barbara Okorn", is written above the typed name.

Barbara Okorn, Environmental Scientist
Office of Environmental Programs



Printed on 100% recycled/recyclable paper with 100% post-consumer fiber and process chlorine free.
Customer Service Hotline: 1-800-438-2474



OFFICE OF
EXECUTIVE DIRECTOR
717-787-3633

COMMONWEALTH OF PENNSYLVANIA
Pennsylvania Game Commission

2001 ELMERTON AVENUE
HARRISBURG, PA 17110-9797

*"To manage all wild birds, mammals and their habitats
for current and future generations."*

ADMINISTRATIVE BUREAUS:
PERSONNEL 717-787-7836
ADMINISTRATION 717-787-5670
AUTOMOTIVE AND
PROCUREMENT DIVISION 717-787-6584
LICENSE DIVISION 717-787-2084
WILDLIFE MANAGEMENT 717-787-5529
INFORMATION & EDUCATION 717-787-6286
WILDLIFE PROTECTION 717-787-5740
WILDLIFE HABITAT
MANAGEMENT 717-787-6818
REAL ESTATE DIVISION 717-787-6568
AUTOMATED TECHNOLOGY
SERVICES 717-787-4076

www.pgc.state.pa.us

February 13, 2009

Kristina Heister
Natural Resource Manager
Valley Forge National Historical Park
1400 North Outer Line Drive
King of Prussia, PA 19406

Dear Ms. Heister:

This letter is in response to your inquiry regarding the Game Commission's position on marking of individual animals if fertility control products are ever approved for use in free-ranging deer populations. For reasons explained below, the Game Commission would require permanent, visible marking, such as ear tags, for all treated deer.

At this time there is no truly effective contraceptive agent available for use in managing free-ranging deer populations. As a result, any future use of contraceptive agents in Pennsylvania will represent its initial use. Similar to other first time uses of new management techniques, proper monitoring and evaluation of the effectiveness of a contraceptive agent will be imperative.

Visible marking will permit monitoring of population abundance and treatment levels. Basic questions regarding initial use of contraceptives include;

- 1) How many deer are there?
- 2) How visible and treatable are the deer in the population?
- 3) Does the population get smaller, larger, or remain the same?
- 4) How many deer were treated?
- 5) How effective was the treatment in preventing pregnancy?

To answer these questions and monitor effectiveness of contraceptives, the Game Commission will require users of contraceptives to mark treated deer with permanent, visible markers.

Other requirements also will need to be met prior to any use of contraceptive on white-tailed deer in Pennsylvania. Requirements will reflect characteristics of an approved contraceptive agent, laws and regulations, and wildlife management policies. However, with respect to your specific question regarding marking of treated deer, I trust this response answers your question.

Sincerely,


Carl G. Roe
Executive Director



"Tardiff, Jeannine"
<jtardiff@state.pa.us>
02/19/2009 03:34 PM
EST

To: "Kristina_Heister@nps.gov" <Kristina_Heister@nps.gov>
cc: "Rosenberry, Christopher" <chrosenber@state.pa.us>, "DuBrock,
Calvin W" <cdubrock@state.pa.us>, "Boyd, Robert"
<roboyd@state.pa.us>
Subject: VF Deer Management Plan - PGC Comments

Kristina,

Thank you for the opportunity to comment on the Valley Forge Deer Management Plan. This document should serve you well in managing the many resources of the park. Several persons from the Game Commission reviewed the plan and we would like to offer comments for your consideration.

1. Deer have a significant impact on surrounding lands and people traveling through and around the park. These impacts should be given considerable weight given the landscape in which Valley Forge (VF) is located yet nothing is mentioned in the objectives about these human impacts. For example, deer-vehicle collisions are the primary cause of mortality for deer at VF. Although the park has specific historical responsibilities, VF must be a responsible community member and it seems reasonable to elevate impacts on neighbors and travelers to an objective level. This subject is addressed lightly in chapters 2&3 but not nearly to the degree that it needs to be.
2. Page 1-32, 3rd paragraph: This paragraph is not relevant to this plan. Given the limited scope of VF and its deer management plan, discussion of statewide trends is meaningless. The importance of deer-vehicle collisions at Valley Forge and around the park warrants discussion here.
3. Page 2-9, 4th paragraph: the PGC does not maintain deer-vehicle collision records on a statewide basis.
4. CWD Response: If alternatives A or B are selected and CWD is discovered in the vicinity of the park, VF risks supporting the highest concentration of deer in an area where the PGC is working to reduce deer populations in response to CWD. This would make PGC efforts to define and contain this disease extremely difficult and seems like a poor choice for all resources involved.
5. Page 2-22, last paragraph: the term "gradually" could be more accurately replaced by "slowly". This term more accurately reflects the best case scenario of non-lethal actions.
6. Concerns with tonsillar biopsy for CWD detection. The logistics of this sampling method (difficulties collecting sufficient follicles in samples and high deer densities) would make it very difficult to implement successfully.

7. Selection of alternative D as preferred to C is confusing. The plan initially indicates that alternative C is the most efficient, but then unclearly explains how D becomes as efficient as C (page 2-56). However, if both C & D achieve the same goal, how can D be as efficient as C if it costs twice as much (page 2-63). If some other factor makes D more appealing, it needs to be more clearly stated.

Thank you for accepting our comments. We hope they prove helpful in finalizing the Valley Forge Deer Management Plan.

Sincerely,

Jeannine Tardiff Fleege

Wildlife Biologist, Deer & Elk Management Section

PA Game Commission

724-238-1826

jtardiff@state.pa.us <<mailto:jtardiff@state.pa.us>>

BOARD OF SUPERVISORS
TREDYFFRIN TOWNSHIP

Supervisors:

Warren E. Kampf, *Chairman*
Robert W. Lamina, *Vice Chairman*
Bill DeHaven
John P. DiBuonaventuro
Mark DiFelicianantonio
Judy L. DiFilippo
Paul W. Olson

CHESTER COUNTY
1100 DuPortail Road
Berwyn, PA 19312-1079

(610) 644-1400 FAX (610) 993-9186
Email: tredyffrin@tredyffrin.org
Website: www.tredyffrin.org

Mimi Gleason
Township Manager

Larab McErlane PC
Solicitor

February 17, 2009

Michael Caldwell
Superintendent
Valley Forge National Historical Park
1400 North Outer Line Drive
King of Prussia, PA 19406

Re: Valley Forge National Historical Park's White-tailed Deer Management Plan

Dear Mr. Caldwell:

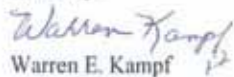
Of the proposed deer management alternatives in the December 2008 draft of the White-tailed Deer Management Plan/Environmental Impact Statement, Tredyffrin Township supports Alternative D, Combined Lethal and Nonlethal Actions. This alternative addresses our need for a sizable reduction in Valley Forge National Historical Park's deer population to a more sustainable level as soon as possible, followed by a long-term strategy to maintain that level.

Improving public safety through fewer deer-related accidents is a community priority, and therefore so is the need to quickly reduce the deer population in the Park. The only options for achieving that goal are the lethal actions of sharpshooting and capture/euthanasia included in Alternative D.

Of course, maintaining a smaller deer population is equally important, not only for continued public safety, but also for the environmental and aesthetic benefits. Over time, fewer deer will allow for the growth of a greater diversity of vegetation in and out of the Park, which will contribute to a more balanced ecology, improved control and filtering of stormwater runoff, and the opportunity for increased enjoyment of nature, gardening and outdoor recreation by our residents. While lethal actions appear to be the only viable option for maintaining a smaller herd right now, Alternative D leaves open the possibility of using nonlethal reproductive control if and when an acceptable chemical control agent becomes available.

The Tredyffrin Township Board of Supervisors applauds Valley Forge National Historical Park's efforts to find solutions to the problem of deer overpopulation. Please do not hesitate to contact us if we can assist you in any way.

Sincerely,



Warren E. Kampf
Chairman of the Board of Supervisors

cc: Tredyffrin Township Board of Supervisors
Chester County Commissioners
The Honorable Jim Gerlach
The Honorable Arlen Specter
The Honorable Bob Casey