NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NOTICE: 01-GSFC-03

National Environmental Policy Act: Wildlife Management

AGENCY: NASA's Goddard Space Flight Center

ACTION: Finding of No Significant Impact

SUMMARY: Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321 et seq.), the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 CFR Parts 1500-1508), and NASA policy and procedures (14 CFR Part 1216 Subpart 1216.3), NASA has made a Finding of No Significant Impact (FONSI) with respect to the proposed wildlife management actions.

There are many types of wildlife or faunal species on the Goddard Space Flight Center (GSFC), located at Greenbelt, Maryland. Three species have been identified which are overabundant and are contributing to ecological damage, posing public safety threats, and causing adverse impacts with humans. The three species are white-tailed deer, Canada goose, and beaver.

DATE: NASA will proceed with implementing outlined actions immediately following the first day of publication of this FONSI.

ADDRESSES: Address any inquiries to the Safety and Environmental Branch, to the Attention of Wildlife Management, Goddard Space Flight Center, Code 205.2, Greenbelt, MD 20771.

A limited number of copies of the supporting EA are available by writing to the above address. Copies of the EA may be viewed at:
1) Goddard Space Flight Center Visitor Center, Soil Conservation Service Road, Greenbelt, MD 20771.
2) Prince George's County Memorial Library System:
   a) Greenbelt Branch, 11 Crescent Road, Greenbelt, MD 20770
   b) Laurel Branch, 507 7th Street, Laurel, MD 20707
   c) Bowie Branch, 15210 Annapolis Road, Bowie, MD 20716
   d) New Carrollton Branch, 7414 Riverdale Road, New Carrollton, MD 20784.

FOR FURTHER INFORMATION CONTACT:

Darlene Squibb, 301-286-6137, Darlene.E.Squibb.1@gsfc.nasa.gov, or
Lizabeth Montgomery, 301-286-0469, Lizabeth.R.Montgomery.1@gsfc.nasa.gov.

SUPPLEMENTAL INFORMATION:

A draft EA was released to GSFC employees and the local community the week of May 9, 2000 inviting public comments. Public announcements were placed in local newspapers, specifically, the Greenbelt News Review; Greenbelt/College Park Gazette, Laurel Leader; and Bowie Blade, to view the document deposited in the local libraries of these communities. In addition, letters and a copy of the document were mailed to the Mayors of Greenbelt, Laurel, New Carrollton, and Bowie which are local neighboring communities located in Prince George's County, Maryland. Other employee announcements were made using internal GSFC advertising methods. All coordinating agencies were also sent a copy of the document including neighboring Federal facilities such as Patuxent Wildlife Research Center and Refuge, and the Beltsville Agricultural Research Center. The comment period closed on June 16, 2000 with 29 individual comments. These were taken into consideration and addressed in the final EA by appendix with a summary of comments.

NASA has reviewed the EA for wildlife management and has determined it represents an accurate and adequate analysis of the numerous proposed wildlife management actions, and the scope and level of associated environmental impacts. The EA is hereby incorporated by reference in this FONSI.

The cooperating Federal agency is: United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services, 1568 Whitehall Road, Annapolis, MD 21401.

In summary, the proposed wildlife management actions are as follows:

*White-tailed Deer – Reduce and manage population through lethal taking of a number of deer to reach goal populations. Resultant meat would be donated to a food bank. Continue Black-legged tick reduction treatment research on Center.

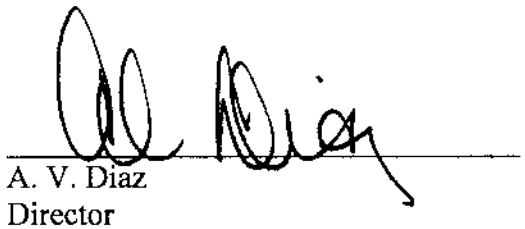
*Canada Goose – Modify habitat to discourage overpopulation, addle eggs, and hire herd dogs to patrol areas on GSFC. If non-lethal methods prove to be inadequate, a round up or hunt and food donation may be implemented.

*Beaver – Modify habitat, install an exclosure to traveling routes, and use annual trapping if necessary.

The objectives of the wildlife management actions are to minimize the ecological impact caused by overgrazed vegetation which allows soil erosion and habitat destruction for other wildlife; decrease the nutrient loading from excess droppings which causes algae growth; improve public safety and health through fewer threats of auto collisions, exposure to ticks and tick-borne diseases, and bacteria from excessive droppings; improve wildlife health by reducing populations and competition for resources; and improve habitat diversity along with working with the land management goals of the Chesapeake Bay Program.

The proposed actions and alternatives, including the no-action alternative, were examined. Many non-lethal deterring or hunting alternatives considered were either impractical or ineffective in meeting objectives. The EA considers water quality, land and biotic resources, and adverse health and safety impacts. The proposed actions would not have substantial adverse impacts on these environmental factors. Further indications are that actions would have a positive impact to water by reducing the biological loading and algae growth; would increase the biotic diversity and stability of land by allowing native vegetation to flourish and other wildlife to find habitat; and would improve public health and safety by reducing risks of bacteria exposure through excessive droppings, tick-borne illnesses and reduced threats of auto collisions. No other matters of environmental concern were identified.

On the basis of the Wildlife Management EA and underlying reference documents, NASA has determined that the environmental impacts associated with the proposed actions will not, individually or cumulatively, have a significant impact on the quality of the human environment. Therefore, an environmental impact statement will not be prepared.



4/6/01

A. V. Diaz
Director
NASA's Goddard Space Flight Center

Date

ENVIRONMENTAL ASSESSMENT
FOR
WILDLIFE MANAGEMENT
AT
GODDARD SPACE FLIGHT CENTER
GREENBELT CAMPUS
Greenbelt, Maryland

Environmental Assessment
For
Wildlife Management at Goddard Space Flight Center
Greenbelt Campus

Lead Agency:	National Aeronautics and Space Administration Goddard Space Flight Center Greenbelt, Maryland 20771
Cooperating Agency:	U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services 1568 Whitehall Road Annapolis, Maryland 21401
Proposed Action:	The management of wildlife on the Greenbelt Campus with current actions identified for three species
Point of Contact:	Darlene Walter Safety and Environmental Branch NASA's Goddard Space Flight Center Greenbelt, Maryland 20771 Telephone: (301) 286-6137
Date:	July 2000

EXECUTIVE SUMMARY

There are many types of wildlife or faunal species on the Goddard Space Flight Center, Greenbelt Campus. To date, little action has been taken to manage any of the species existing on the campus. Three species have been identified which are considered overabundant, contributing to ecological damage, posing public safety threats, and causing adverse impacts with humans. The three species are white-tailed deer, Canada goose, and beaver. This Environmental Assessment examines the need for wildlife management, considers various alternatives and their environmental consequences, and proposes recommended management actions including the no-action alternative.

In summary, the current proposed wildlife management actions are as follows:

*White-tailed Deer – Reduce and manage population through lethal taking of a number of deer to reach goal populations. Resultant meat would be donated to a food bank. Continue black-legged tick reduction treatment research on Center.

*Canada Goose – Modify habitat to discourage overpopulation, addle eggs, and hire herd dogs to patrol areas on Center. If nonlethal methods prove to be inadequate, a round up or hunt and food donation may be implemented.

*Beaver – Modify habitat, install an exclosure to travelling routes, and use annual trapping if necessary.

This assessment considers the safety of employees, the cultural and social value of the property, and the needed ecological restoration to the environment. Alternatives were considered individually for each species and some eliminated from further study when there was no evidence of effectiveness, availability, or the alternative was deemed inappropriate for the Center given its operations and cultural and social environment. Proposed actions and the no-action alternative consider consequences such as ecological damage, public safety and health, wildlife health, and the goals of the Chesapeake Bay Program Memorandum of Agreement.

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1.0 PURPOSE AND NEED

The Greenbelt Campus of Goddard Space Flight Center (GSFC) consists of approximately 1,250 acres of land. In accordance with the Environmental Resources Document prepared for GSFC in 1993 of Faunal Species, several wildlife observations were made and known to exist on the Greenbelt Campus. Three species contribute to ecological imbalances and public safety threats. The three species are white-tailed deer (*Odocoileus virginianus*), Canada goose (*Branta canadensis*), and beaver (*Castor canadensis*). While these species continue to thrive, other biological species have declined because of their inability to compete with them. The disappearance of native plants with understory browsing by deer is easily observable by a browse line across the West and East Campuses (see Appendix 3). This affects the ability of the woodlots to allow native species to develop from seedling recruitment to maturity and maintain native plant diversity of the woodlots. Should a catastrophic event remove the top layer of trees, there would be no understory to maintain the woodlots. It is a challenge to keep ornamental plants from being consumed by deer. Auto collisions with deer are a threat to public safety as deer browse near and run across the main roads. Deer are known to be a main adult host of Lyme disease carrying ticks, which are a threat to employees spending time outdoors and those assigned to field work. Geese have grazed grassy areas of the West Campus Main Pond area and have impacted native waterplants as well. Goose nesting activities have disrupted employees' free access to buildings by aggressively defending their nests and surrounding territory. Goose excrement has littered the walkways, making them unsightly, messy, and rich with bacteria, and it contributes to a high nutrient loading to the pond. Beaver have removed many shoreline trees and have moved across the shoreline to woodlots to seek out most favored species of trees.

To date little action has been taken to manage wildlife, except for infrequent beaver population management, and some habitat modifications undertaken in recent months to discourage beaver and geese from favoring the West Campus Main Pond. Feral cats and dogs have been trapped over the years and turned over to the Prince George's County Animal Services. The ecological impacts, public safety and health threats, and incidents caused by the identified wildlife species indicate that certain wildlife are at a population threshold where inaction has greater risks than action. Therefore, the need to manage certain wildlife species at the Greenbelt Campus of GSFC exists.

White-tailed Deer

Populations have increased over the years. Population counts were initiated on West Campus in 1994 (see Appendix 1). Various numbers were arrived at that year by organized counts with an average of 50 deer observed in 1994. The count reached 74 in October of 1998 on the West Campus. These counts were initiated in conjunction with a

vegetation study, entitled Tree Regeneration in Small Forest Patches: Interactions of Browsing and Abiotic Factors completed in 1996 under a NASA/GSFC grant.

Automobile strikes have increased and approximately four occur per year. This is a source of deer mortality and potential human danger and property damage. There is no system to count near misses but some employees have expressed concern over near misses which can result in auto collisions.

Lyme disease carrying ticks (Black-legged tick, *Ixodes scapularis*) are prevalent on the Center along with the Lone star tick (*Amblyomma americanum*) and the American dog tick (*Dermacentor variabilis*), which carry other diseases. White-tailed deer are a primary adult host of the Black-legged tick in the reproductive stage.

Significant native plant damage from deer browsing has been experienced over the years in the woodlots on campus. An easily observable browse line exists on the West and East Campuses from deer browsing the forest understory. The continual deer browsing eliminates understory vegetation from the GSFC woodlots. This affects the ability of the vegetation to regenerate and it affects soil stability. This also eliminates habitat for small mammals and song birds. The woodlots have few tree stands in small size class to allow regeneratation of the forest area. Campus trees are often damaged from deer rubbing which removes bark, making the trees susceptible to disease. Ornamental plantings are fenced as protection from deer browsing and are a landscape challenge. A vegetation study entitled Tree Regeneration in Small Forest Patches: Interactions of Browsing and Abiotic Factors, a research study which began in 1992 and culminated in 1996, for GSFC, sets forth the following statement: *the extreme lack of understory, prevalence of browsed twigs, and low number of trees in small size classes attest to the impact of deer on the structure of the forest.* (See Appendix 2 for conclusions of the research.) Native plants play an important role in the ecology of the forest. With their generalists herbivorous diet, deer will exploit the most favorable plants, but after these have disappeared the deer will eat less favorable plant species. This results in lower plant species diversity. See Figure 1-1 for example of damaged understory and Figure 1-2 for an example of healthy understory.

Figure 1-1: Browse line from West Campus woodlot

Figure 1-2: Healthy understory from woods outside of East Campus gate on Soil Conservation Road

Estimated populations and desirable populations have not yet been developed for the satellite areas. As population management progresses, these areas will be examined as well.

Tick population control research, as a means to reduce Lyme disease, has been carried out on the West Campus since April of 1995. This research consists of treatment of deer with a topical application of an insecticide, permethrin. The treatment has resulted in a reduction of the tick population on the GSFC West Campus. This research has been carried out by the U.S. Department of Agriculture (USDA) with a researcher from Walter Reed Army Institute of Research. The resultant data (see Appendix 4) has shown a decrease in the tick population and, therefore, a reduced threat of tick-borne disease to employees on the West Campus. As an indirect benefit, the permethrin has also reduced the population of the American dog tick and the Lone-star tick, both found on the Center

along with the deer ticks. These two tick species also potentially spread Rocky Mountain spotted fever, Lyme disease and Ehrlichiosis. The ticks are a threat to those spending time outdoors for recreation and those employees assigned to field work.

Tick treatment research has not been conducted on the East Campus but the threat of tick-borne illnesses including Lyme disease to employees exists on the East Campus as well. This is a concern with increasing numbers of employees being relocated to the East Campus. A new 3-year Lyme disease research study has been added to include the East Campus with initiation of it in the summer of 1999. The early research tick counts have been very high on this campus compared to the West Campus at this point in the research. The Permethrin treatment will be added along with the research beginning in the fall of 1999.

Deer population management is necessary to reduce the threat of auto collisions, Lyme disease, vegetational browsing, and to allow for regeneration of native plants and the role that GSFC contributes to the local area ecology and as part of a Chesapeake Bay watershed. The impact to the land from the deer population has been pointed out by the U.S. Army Corp of Engineers with their Report entitled *Anacostia Federal Facilities Impact Assessment* dated October 1997. The objective of deer management would be to bring the deer population to a size that is below ecological damage (i.e., to allow forest native plant regeneration). The resultant reduction in population would also reduce the risk of other safety concerns.

Based on the best available research on vegetation published in the Journal of Wildlife Management (under reference no.13), entitled *Impacts of White-tailed Deer on Forest Regeneration in Northwestern Pennsylvania*, a desirable population to allow forest regeneration is 20-25 deer per square mile. West and East campus are somewhat less than a square mile, therefore, 20 deer for the West Campus and East Campus would be desirable. While no deer counts until spring of 1999 have been conducted on the East Campus (roughly estimated to contain 50 deer), the same browse conditions and lack of understory exists.

The overabundance of deer also poses a hazard to the neighboring roadways of the Baltimore/Washington Parkway, Greenbelt Road, and Soil Conservation Road with the movement of deer. Lack of population management also infringes on our neighboring facility efforts to keep deer numbers below ecological damage and to maintain the land value of what is known as the federal green wedge.

Canada Geese

Canada geese that do not make annual migration in the spring and fall to the sub-arctic breeding areas are considered resident geese. Resident geese that nest at GSFC have

greatly increased. They have adapted to the mild winters and do not migrate. During the nesting season of 1998 and 1999 (March – May), significant human impacts were experienced. With the geese becoming adaptable and complacent to human presence, physical attacks on employees occurred around nesting areas. Particularly of concern are shrub areas around buildings and parking lots where there is much pedestrian traffic. Population counts during May and June of 1999 have shown over 100 geese have been recorded on the campus. The impact on the campus can be observed with grazing starting at the Main Pond (see Figure 1-3) and spreading to the east side of West Campus through to the Visitors Center. Although predators, such as fox, are present and observed on Center, they have not made an impact on the abundant populations. Goose excrement was scattered all across the West Campus during the summer molting period (when the geese are flightless) and in the Main Pond areas at Cobe and Explorer Roads (see map marked Appendix 3) extending to Buildings 1, 3, 8, 11, 21, and 90 year round. Population control measures are needed to lessen the conflicts with humans; reduce bacteria laden excrement on walkways; allow overgrazed vegetation to replenish; and to keep the population in check. Geese are known to return to the same nesting area year after year, therefore, human conflicts are likely to continue year after year.

Figure 1-3: Geese grazing at shoreline at Main Pond with diminishing grasses

Population control measures are needed to take place during nesting season to mitigate nesting territory and human conflicts. There is no scientific basis to estimate a desirable goose population to bring in balance with land size. However, to reduce conflicts with humans, the socially desirable population would be around 30 birds based on where it was at a point some years ago when conflicts were rare. Habitat modifications are also needed to make the West Campus a less desirable habitat and to encourage geese to find new homes. Employees need to be educated on appropriate interaction with wild animals and discourage supplemental feeding, which encourages population overgrowth. The overall objective to managing the goose population is to keep resident populations down, to reduce ecological impacts and to reduce human conflicts with wild animals.

Beaver

Beaver habitat is almost anywhere there is a source of water. Although some additional beaver disturbances have been surpressed by fencing and trapping throughout the Center, the Main Pond is of particular concern with the continual return of beaver. Beaver diet consists of woody species, with a preference toward maples, black willow, sweetgum, blackgum, tulip poplar, and pine. The loss of these species contributes to vegetation loss on the shoreline and the loss of riparian buffer which contributes to erosion. Beavers are adaptable and will use whatever materials are available to construct dams. Beavers can significantly change landscape and hydrology to an area by constructing dams and creating flooding. The damming and flooding have potential impacts to the waterflow on the campus and the maintenance of proper stormwater and runoff management.

Shoreline trees around the Main Pond have diminished significantly in the past 5 years (see Figure 1-4) as compared to the shoreline from the opposite side in 1998 (see Figure 1-5) from beaver damage. Nonlethal beaver deterrents need to be installed and, if necessary, annual trapping may be needed to control the beaver damage to maintain the riparian buffer of the pond for stormwater control; recreational opportunities; and the ecological integrity of the land area. The objective with management of beaver is to exclude them from the Main Pond and keep beaver travelling along the watershed to areas where vegetation loss and hydrology changes can be afforded without impact to stormwater and runoff from campus.

Through several agreements, the Memorandum of Agreement between the NASA and the U.S. Environmental Protection Agency, Chesapeake Bay Program and the Federal Agencies' Chesapeake Ecosystem Unified Plan, NASA has become partners in the Chesapeake Bay Program. As partners, NASA is committed to restoration and protection of the Chesapeake Bay through improving the condition of the Bay watershed. GSFC has participated in numerous studies by the U.S. Army Corps of Engineers as part of the Chesapeake Bay Program. In these studies, the Corp reported the deer and goose populations and the resultant impact on biological resources and recommended several actions for GSFC to work cooperatively toward ecosystem restoration goals. Wildlife management was one of the recommended actions. The studies are documented in an October 1997 report for the Anacostia Federal Facilities Impact Assessment.

Figure 1-4: Pond area appoximately 5 years ago with grasses and shoreline trees

Figure 1-5: Pond area 1998 with overgrazed grasses and diminishing trees

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

I. Proposed Action

Take management actions as deemed appropriate with examination of the need as a result of impacts occurring and recognized hazards to public safety and health after examining alternatives for each species. Current plans for three recognized species are addressed individually below.

II. Proposed Alternative

The alternative is no action. Leave nature to its own natural regulations to reach an equilibrium. In a natural system of predators, this will likely occur. However, urbanization has caused deer, geese, and beaver to be essentially devoid of natural predators. This will allow the animals to continue to increase in population size and outcompete other species reducing the diversity until starvation or disease causes mortality. The biological support of these growing populations often adds loading to an ecosytem and becomes out of balance. Growing populations of wildlife species pose adverse human impacts by becoming complacent of human presence, which causes aggressiveness. Driving hazards, ticks, and excrement on walking areas pose health threats to employees as well as neighboring communities.

I. a. Proposed Action for White-tailed Deer

Sharpshooting on GSFC property is the proposed action. Highly skilled and trained sharpshooters would be recruited for safe and accurate firearms operation with appropriate community communications. This can be done safely and effectively in lieu of a managed hunting program on the West and East Campus.

The goal will be to reach a population below ecological damage. For West and East Campus, no more than 20 deer for each campus is desirable. For population management purposes, antlerless (or female) deer are targeted in that bucks mate with as many females as possible, therefore, population goals are not met when targeting males. Attempts will be made to preserve the current piebald (white) deer residing on the Center. The resulting meat would be donated to a food bank. Contraceptives will be considered at a time when other studies are concluded and results provide a cost-effective protocol that can be used as a management tool.

Continue topical deer treatment with permethrin via deer treatment stations (see Figure 2-1) located in woodlots on West Campus and East Campus when feasible. The treatment stations hold small amounts of corn and when deer feed from the stations, the roller applies permethrin to their pelage. The continued treatment would be accomplished through a GSFC contract for maintenance of the feeders and for safe and proper use of the insecticide. USDA will continue the research sampling. The research will be done cooperatively with USDA and NASA grants.

Figure 2-1: Deer Treatment Center in woodlot

II. a. Alternatives Considered for White-tailed Deer

Feeding – Supplemental foods would be provided for the deer for nutrition. This alternative is counterproductive in that increased nutrition would cause the population to increase and the amount of food required would increase accordingly. Public safety threats and vegetation damage would increase. Therefore, this is not an effective alternative.

Trap and relocate to another site – This would involve tranquilizing, trapping, and relocation to another site. There are no areas available which have low numbers of deer within a reasonable proximity which can either absorb excess deer or are willing to accept them. Even if relocated to other hunted areas, the deer would have to compete with deer already in that habitat. Handling deer during relocation efforts produces stress-related mortality. Disease and parasites can be moved with relocated deer. Deer trapping and relocation efforts are costly and ineffective. For these reasons, this is not a viable alternative.

Fertility control – This alternative consists of delivering a birth control hormone or vaccine to deer. Several deer studies are currently being conducted around the country, including a study at the National Institutes of Standards and Technology (NIST) in Gaithersburg, Maryland. A proposal submitted by GSFC in 1994 to be included in that contraception study with the Humane Society of the United States was not selected. Contraceptive use for deer remains in a research stage and questions persist as to the methods of delivering the contraceptive, percentage of does requiring treatment, regulatory issues, effects on deer social structure, the impact on the overall long-term health of the deer population, and public health considerations. There have been no proven management methods with documented reductions to date from this or similar studies or any other contraceptive studies. Experimental drugs used on the animals exclude them from human consumption.

At NIST, the deer herd has increased significantly during the 4 years of study (from approximately 200 deer at start to approximately 300 deer). Even though research shows a decrease in birth rate, it does not affect the death rate. The research is labor intensive and costly; with experimental protocols and drug permitting necessary.

The possibility of sterilizing males is impractical in that one unsterilized male can impregnate many females. The labor involved in seeking and finding all the males and the possibility of new unsterilized resident males entering the area warrants sterilization to be impractical.

There are no fertility control management options with a recommended protocol and approved drugs that have been based on research. There are no oral contraceptives available. Contraceptives are under study and, therefore, are not a viable alternative at this junction.

Managed and public hunting program – Allow general public to hunt deer on facility. Managed hunting is the most cost effective method of regulating deer numbers. However, due to the dense population of employees and mission critical operations on a 24-hour basis, public hunting would not be considered safe for the employees on the West and East Campus and on the surrounding local communities. However, safe hunting could be established on the GSFC satellite areas 200 and 300/400 and will be examined for collaboration and coordination with the USDA/Beltsville Agriculture Research Center managed hunting program. In this case, any hunting actions would have to be evaluated for appropriateness under GSFC gun policies.

Reintroduce predators – Wolves and mountain lions are effective predators that can maintain the stability of deer herds. However, this option is infeasible in that GSFC is too developed and populated with humans to provide suitable habitat for predators, and large predators also pose a concern for human safety.

Chemical euthanasia – Requires a labor intensive process to capture and administer chemical euthanasia and it excludes animals for human food donation. Barbituate intravenous application requires that animals euthanized with this method must be cremated for disposal. Potassium Chloride requires the animal to be anesthetized before it is administered. For these reasons, chemical euthanasia is not a practical lethal option.

Chemical spraying of grounds for control of black-legged ticks – Mass spraying of grounds is inconsistent with GSFC chemical use policies. Sprays are non-selective in species and damaging to the environment with run-off. Insecticides pose public health risks. Because of the environmental consequences, this is not an environmentally beneficial option.

III. a. No-Action Alternative for White-tailed Deer

No action to deer herd population management means that deer herds may grow until they reach the upper limit at which point they could be sustained by local habitat. Herds at this "upper density limit" would be in relatively poor health prone to cyclic population fluctuations. Without natural predation, the results would most likely be disease and starvation; continual browsing to native plants and ornamentals; increased risk of auto collisions; and lack of forest regeneration.

No action to deer tick control is to cease the topical treatment to deer. Deer will be abundant with adult black-legged and other disease carrying ticks. The threat of Lyme disease and other tick-borne diseases will prevail with greater regeneration of tick populations. This would affect those spending time outdoors.

I. b. Proposed Action for Canada Geese

This action consists of modifying habitat back to the natural landscape by replenishing vegetation and by less mowing around the Main Pond and sedimentation pond on West Campus on Cobe and Explorer Roads (see Appendix 3 for area). New plantings of shrubs, grass, and water plants would be initiated to replenish and restore the area to a natural setting which existed just a few years ago. Provide employee education on "no feeding" policy and appropriate interaction between wild animals and humans by providing signage and written communications.

Hire human friendly, trained, herd dogs to be deployed with trainer supervision at irregular times and places where geese are undesirable around campus and to discourage nesting in populated places such as around building shrub areas and parking lot islands.

The dogs would chase the geese to the pond area or off-site to discourage a complacent residence on the GSFC West Campus.

During nesting season, addle eggs (by inhibiting development of egg to hatchling) to keep population of new hatchlings down. Besides not producing new hatchlings, geese often will not nest in the same area where an unproductive nest has resulted which will also discourage residence. Proper permitting will be sought in accordance with the Migratory Bird Treaty Act (MBTA). Should nonlethal methods be found ineffective, lethal round ups will be examined and pursued.

II. b. Alternatives Considered for Canada Geese

Exclusion devices – This would include placing grids over the top of the pond water to repel geese from the water. This alternative has been successfully used in known places, however, since GSFC has an active employee fishing club, this would exclude the use of the pond for recreational fishing.

Frightening devices – Noise and viewing devices can be installed to frighten geese away. While useful on agricultural sites, they are considered inappropriate for GSFC since noise devices are a nuisance to humans and sight devices detract from the aesthetics of the Center. Resident geese are known to become adapted to these devices over a period of time. The maintenance required for the devices also makes them cost ineffective.

Relocating – Experiments were done some years back to relocate geese and proved to be costly and ineffective. Birds were banded for identification and moved miles away where more geese could be afforded. It was found that many birds eventually find their way back to what they consider home. Identifying an area that could absorb additional populations of geese would be difficult.

Hunting – Canada geese are protected under the MBTA (16 USC 703-712). Coordination with appropriate federal and and state agencies would be required to be sought for proper permitting. Due to dense population of employees and mission critical operations on a 24-hour basis, public hunting would not be considered safe for the employees of the East and West Campus where the current goose populations exist.

Lethal Roundup – This would involve rounding up geese when they are flightless in the months of May and June, euthanizing and donating the meat. The Canada geese are protected under the MBTA. Coordination with appropriate federal and state agencies would be sought for proper permitting if such action became necessary. If nonlethal methods are found to be ineffective this alternative will be examined further.

III. b. No-Action Alternative for Canada Geese

This would result in an increase in the goose population and would continue to allow them to graze and consume existing vegetation, increase bacteria laden excrement on traveled areas, and interrupt human activities by aggressive attacks.

I. c. Proposed Action for Beaver

Continue to modify habitat by wire wrapping shoreline trees. Install exclusion devices to Center outfalls to allow beaver to travel off the facility but not onto the facility. Should habitat modifications prove to be unsuccessful, utilize the State of Maryland beaver trapping season to mitigate damage at the Main Pond with State licensed trappers.

II. c. Alternatives Considered for Beaver

Exclusion – Along with wrapping of trees, other exclusion devices were considered. Fencing becomes cost prohibitive and time consuming in that the beaver will move further away from the shoreline. Fencing of pipes can promote flooding by providing additional materials to beaver for dam making to stop flowing water. Proper water flow is required by stormwater permits. Beaver baffles, designed to deceive beaver, make changes to water level and flow. Changes are inconsistent with stormwater management and lower water levels affect the recreational fishing that is done at the Main Pond.

Live trap and relocate to another site – Relocation is not allowed by the State of Maryland because there are no areas that can absorb additional population of beavers. Therefore, live trapping is prohibited without a place to relocate.

Repellants and Toxicants– There are none registered for beavers.

III. c. No-Action Alternative for Beaver

This will allow beaver to continually establish homes and colonize at the GSFC Main Pond. There are no known local predators to the beaver. The beaver damage activity will continue to diminish the shoreline trees and trees within close proximity (riparian buffer) and allow for erosion and sediment run off. It also diminishes the aesthetic value to those enjoying the forest atmosphere around the pond.

3.0 EXISTING ENVIRONMENT

Abstract of Greenbelt Facility Land Use and Ecology

The Greenbelt Campus consists of approximately 1,250 acres of land. The breakdown of land areas is as follows:

a. West Campus consists of 447 acres of land, 147 being impervious acres (consisting of buildings, parking lots and sidewalks) and a fragmented forest area consisting of 192 acres with green space of 108 acres.

b. East Campus consists of 414 acres of land, 46 being impervious acres and 368 being forested.

c. Satellite areas consist of the Antenna Test Range (Area 100); Geophysical and Astronomical Observatory (Area 200); Magnetic Test Facilities (Area 300) and Bi-Propellant Test Facility (Area 400). The landspace is as follows:

Area 100: 27 acres, 1.5 impervious, 25.5 forested acres
Area 200: 118 acres, 4 impervious, 114 forested acres
Area 300/400: 242 acres, 6 impervious, 236 forested acres

All of the areas are fenced with 8 ft. barbed wire fence.

Eleven species of mammals were observed visually or by signs of tracking during June of 1992 with the majority being white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), gray fox (*Urocyon cinereoargenteus*), red fox (*Vulpes vulpes*), rabbit (*Sylvilagus floridanus*), gray squirrels (*Sciurus carolinensis*), , eastern chipmunks (*Tamias striatus*), woodchucks (*Marmota monax*) and beaver (*Castor canadensis*). Of birds, 65 species were observed visually or by auditory signs with the majority being forest passerines or woodpeckers. Other observed birds or nesting activity were eastern bluebirds (*Sialia sialis*), barn swallows (*Hirundo rustica*), red-winged blackbirds (*Agelaius phoeniceus*) and Carolina chickadees (*Parus carolinensis*). Observations of raptors were uncommon. Waterbirds that were observed were a majority of Canada geese and goslings, and a brood of mallard (*Anas platyrhynchos*). Other faunal species were observed such as painted turtles (*Chrysemys picta*), bullfrogs (*Rana catesbeiana*), spring peepers (*Hyla crucifer*) and eastern hognose snake (*Heterordon platirhinos*). Fish and aquatic insects were also present such as sunfish (*Centrarchidae*) and whirly-gig beetles (*Gyrinidae*), water striders (*Gerridae*) and adult damselfies (*Odonata*). There are no threatened or endangered species known to exist on the Greenbelt Campus.

West and East Campuses have several stormwater management ponds, the largest being a 6 acre man-made pond on West Campus at Explorer and Cobe Road. Most of West and part of East Campus drain to Beaverdam Creek, a northeast branch of the Anacostia River. A small 0.6 acre sedimentation pond reduces sediment before reaching the 6 acre pond. The remaining percentage of Greenbelt campus drains to a western branch tributary of the Patuxent River.

The Greenbelt campus lies in the western shore section of the Maryland Coastal Plain Province, a subdivision of the Chesapeake Bay. The facility is located within a major vegetational region called the Central Pine-Oak Region extending from Cape Cod, Massachusetts to Central Georgia. Forested habitat of GSFC includes well interspersed mixed tree stands. Most tree stands are relatively mature, with canopy heights of between 19 and 30 meters. A dominant coniferous species in the overstory of conifer and mixed forests is Virginia pine (*Pinus Virginiana*). The dominant deciduous and mixed forests are Oak (*Quercus* spp.); the species of oak varies by location.

Deciduous (seasonal leaf falling trees) species dominate the subcanopy and shrub layer in all forest types. Dominant species constitute the subcanopy layers in all forest types. Dominant species in the subcanopy include sweetgum, red maple, and black tupelo. These species and oak dominate the shrub layer. The dominant ground layer species in most upland areas is blueberry.

Residential communities and business areas are located within a 1-mile radius of the Greenbelt facility. An extensive housing community, including townhomes and apartments exists within that radius from the main gate. Also included in this area are small businesses, a department store, restaurants and schools. Completion of construction of two new buildings on East Campus has occurred in the last 4 years.

An easily observable browse line exists across the forested areas of West and East Campuses which is an indication that the number of deer is not in balance with the available habitat. The deer browsing has eliminated the understory vegetation layer from the GSFC woodlots. At the 6 acre pond grass has been trampled by geese where now little grass is surviving and the shoreline has significantly eroded. The felled trees from beaver activity are observable from the road.

Figure 3-1: Main campus woodlot

Figure 3-2: Main pond shoreline

Figure 3-3: Main pond bank

4.0 ENVIRONMENTAL CONSEQUENCES OF PROPOSED ACTION AND ALTERNATIVES

Proposed Action

The proposed action is to manage wildlife on the Center. Particularly, the current actions proposed for deer should allow native plants and forested understory to regenerate and maintain a diversity of species. Lyme disease should become less of a threat. By reducing the goose and beaver population, the Main Pond would have an opportunity, with some replanting and restoration efforts, to regenerate a shoreline riparian buffer.

Other Alternatives and No-Action

Other alternatives discussed in Section 2.0 were ruled out from further study when there was no evidence of effectiveness, availability, or it was deemed inappropriate for the Center given its operations and cultural and social environment.

The alternative is to take no action to manage wildlife. This would allow flourishing species to continue to grow in population, allow continual impact by browsing to native plants, pose public safety and health hazards, and allow disruptions to Center activities. Additionally, growing populations put the health of the animals in question as well.

The deer browsing has eliminated the understory vegetation layer from the GSFC woodlots. This affects the ability of the vegetation to regenerate and it also affects soil stability. This also eliminates habitat for small mammals and song birds. Should a catastrophic event eliminate the canopy layer of trees, the woodlots have few stands in small size class to quickly regenerate. Ornamental plantings now have to be protected by fenced barriers to prevent deer from consuming them. Deer are known hosts of a variety of adult ticks which can spread tick-borne diseases such as Lyme disease.

At the 6 acre pond, grass has been overgrazed by geese where now little grass is surviving and the shoreline has significantly eroded. Goose excrement has built up significantly around the pond area which creates a high biological nutrient load. Also, beaver damage has significantly decreased the shoreline trees of the pond. With the geese and beaver, the riparian buffer vegetation has decreased allowing accelerated erosion of the shoreline. Various other waterfowl species which were once present have diminished with the abundance of Canada geese.

Additionally, goose excrement build up has extended far beyond the pond area and has encompassed most of the western side of the West Campus including the areas surrounding Buildings 26, 90, 21 (including the cafeteria area) and 11. During moulting

season (May through June), excrement was noted all across the West Campus as the adults and goslings foraged for food.

No action means that public safety and health threats that are posed to employees in risk of auto collisions and exposure to bacteria will continually exist.

Environmental Justice

Executive Order 12898 directs Federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their programs, policies and activities on low-income populations and minority populations in the U.S. There are no environmental justice issues associated with these actions.

5.0 AGENCIES AND INDIVIDUALS CONSULTED

Wildlife biologists within the State of Maryland have been consulted; benchmarking with other federal facilities has been established; consultants and researchers associated with the University of Maryland have been utilized. The following are those consulted with:

1. Maryland Department of Natural Resources, Wildlife Division, 580 Taylor Avenue, Annapolis, MD 21401. Clifton Horton, Regional Coordinator, Outreach and Technical Services; L. Douglas Hotton, Deer Project Leader.

2. U.S. Department of Agriculture, Agricultural Research Services, Beltsville Agricultural Research Center, Beltsville, MD 20705. Tim Badger, Farm Operations Manager.

3. U.S. Department of Agriculture, Animal and Plant Health Inspection Service, 1568 Whitehall Road, Annapolis, MD 21401. Leslie Terry, State Director, Wildlife Services.

4. U.S. Department of the Interior, U.S. Fish and Wildlife Services, Migratory Bird Permit Office, P.O. Box 779, Hadley, MA 01035.

5. U.S. Department of the Interior, U.S. Fish and Wildlife Service, Patuxent Research Refuge, 12100 Beech Forest Road, Laurel, MD 20708. Holliday Obrecht, III, Refuge Biologist.

6. U.S. Geological Survey, Patuxent Wildlife Research Center, 11410 American Holly Drive, Laurel, MD 20708. Dr. Matthew C. Perry.

7. University of Maryland, Department of Biological Resources Engineering, Natural Resources Management Program, College Park, MD 20742. Dr. Lowell W. Adams, Professor; Kenneth Penland, Graduate Researcher; Victoria Solberg, Ph.D. Candidate; Arthur Abrams, Graduate Researcher.

6.0 REFERENCES

1. Appalachian Environmental Laboratory, Center for Environmental and Estuarine Studies, University of Maryland System, Frostburg, MD. Seagle, Dr. Steven, (P.I.), Penland, Kenneth, *Tree Regeneration in Small Forest Patches: Interaction of Browsing and Abiotic Factors*, April 1997.

2. Beaver Management Report and Recommendations for NASA/GSFC, William Bridgeland, Wildlife Biologist, report dated May 12, 1999.

3. Beltsville Agricultural Research Center, *Wildlife Management Plan – Deer and Deer Removal*, September 1995.

4. Connecticut Department of Environmental Protection, Wildlife Bureau, *An Evaluation of Deer Management Options*, 1988.

5. Correspondence from L. Douglas Hotton, Maryland Department of Natural Resources, regarding deer assessment of Goddard Space Flight Center, November 2, 1998.

6. Cooperation Extension, University of Nebraska, Great Plains Agricultural Council Wildlife Committee, U.S. Department of Agriculture, Animals and Plant Health Inspection Service, Animal Damage Control, *Prevention and Control of Wildlife Damage*, Chapters on Beavers and Waterfowl, 1994.

7. Humane Society of the United States, The Animals' Agenda, *Wildlife Immunocontraception, Magic Bullet or Pipe Dream?*, Article written by Dr. Allen T. Rutberg, March/April 1998, pgs. 15-17.

8. Humane Society of the United States, Animal Update, *HSUS in Action, Darting Does*, Article written by Dr. Allen T. Rutberg, Summer 1999, pgs. 2-3.

9. Information gathered from and site visit to the National Institute of Standards and Technology, facility located in Gaithersburg, MD, April 1999.

10. Information gathered from the Naval Research Laboratory, Washington D.C., regarding property known as Chesapeake Bay Detachment near Chesapeake Beach, Calvert County, MD, June 1998 through April 1999.

11. Information gathered from the University of Maryland, Department of Entomology, College Park, MD. Victoria B. Solberg, Ph.D. (Pre-candidate) and Walter Reed Army Institute of Research, Department of Entomology, Washington, D.C. Report titled

"1998 Annual Report Summary, Suppression of Ixodes scapularis and Borrelia burgdorferi by Topical Application of Permethrin by Deer Located at NASA, Goddard Space Flight Center," dated March 4, 1999.

12. International Bowhunting Organization, research paper prepared by Dr. Deborah Green, Faculty Research Associate, College of William and Mary, Williamsburg, VA, *Immunocontraception and Deer Management Technique*, December 1998.

13. Journal of Wildlife Management, 53(3):1989, *Impacts of White-tailed Deer on Forest Regeneration in Northwestern Pennsylvania*, pgs. 524-532.

14. Maryland Department of Natural Resources, (Draft) *Charting the Course for Deer Management in Maryland*, January 1997.

15. Maryland Department of Natural Resources, *Hunting and Trapping in Maryland 1998-1999*.

16. NASA/Goddard Space Flight Center, *Environmental Resources Document, Greenbelt Campus*. Prepared by Metcalf and Eddy, Inc., 1993.

17. New York State Dept. of Environmental Conservation, Fact Sheet, *Deer Contraception Research in New York*, January 1997.

18. Proceedings from a workshop on *Deer Population Control and Habitat Management* held at Patuxent Wildlife Research Center on September 29, 1998.

19. U.S. Army Corps of Engineers, Baltimore District, *Anacostia Federal Facilities Impact Assessment*, Beaverdam Creek Subwatershed, Spring 1998.

20. White-tailed Deer Population Control Options for NASA/GSFC, Dr. Anthony J. DeNicola, White Buffalo, Inc., report dated November 23, 1999.

7.0 LIST OF PREPARERS

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8.0 **PUBLIC INVOLVEMENT**

Prior to release of the Draft Environmental Assessment a preliminary employee comment period was held in the Summer of 1999. Through a website, employees were invited to comment on preliminary research in development of this document. The results from this comment period are addressed on the next page entitled "Preliminary Employee Release for Comments".

Subsequently, the Environmental Assessment was released in draft form to employees and the public of the local community during the week of May 9, 2000. The release was made through various media. Public Affairs submitted a letter and a full hard copy of the document to four Mayors of the local community, the Mayors of Greenbelt, Bowie, Laurel, and New Carrollton. Hard copies of the document were also placed in the branches of the Prince George's County Memorial Library System for public availability in these same communities, and advertisements were made in the local papers with a Notice of Availability. Ads were placed in the Greenbelt News Review, Greenbelt/College Park Gazette, Bowie Blade, and Laurel Leader advising the availability of the document for comment. GSFC employees were invited to a website where a PDF file document was contained for employee comments.

Oral conversations were held with representatives of the City of Greenbelt, with the Greenbelt Animal Control Officer, who received a full hard copy, and the Greenbelt Recycling and Environmental Advisory Committee. While written responses were not received, oral conversations indicated that they were satisfied with the field work and document as written to justify the actions. An oral conversation was held with a representative in the planning department of the City of Bowie, which indicated that the Executive Summary of the document was shared with a newly formed Wildlife Habitat Advisory Group. While a follow-up letter indicated the community was not supportive of lethal actions, the alternative suggestions offered were addressed in Section 2.0 of the document since only the Executive Summary was reviewed.

There were 28 individual commentors during the comment period. Twenty-three of the 29 were GSFC employees, 1 letter from the National Capital Planning Commission, 1 letter from the City of Bowie, 1 letter from a University of Maryland student, and e-mail comments from NASA HQ, and e-mail comments from a Prince George's County high school teacher. A compiling of the comments received during the public comment period which ended on June 16, 2000, is contained in the following charts with responses. Any changes to the final document of the Environmental Assessment, required by responses, were made. The table of comments and responses are attached as Appendix 5.

Preliminary Release for Comments

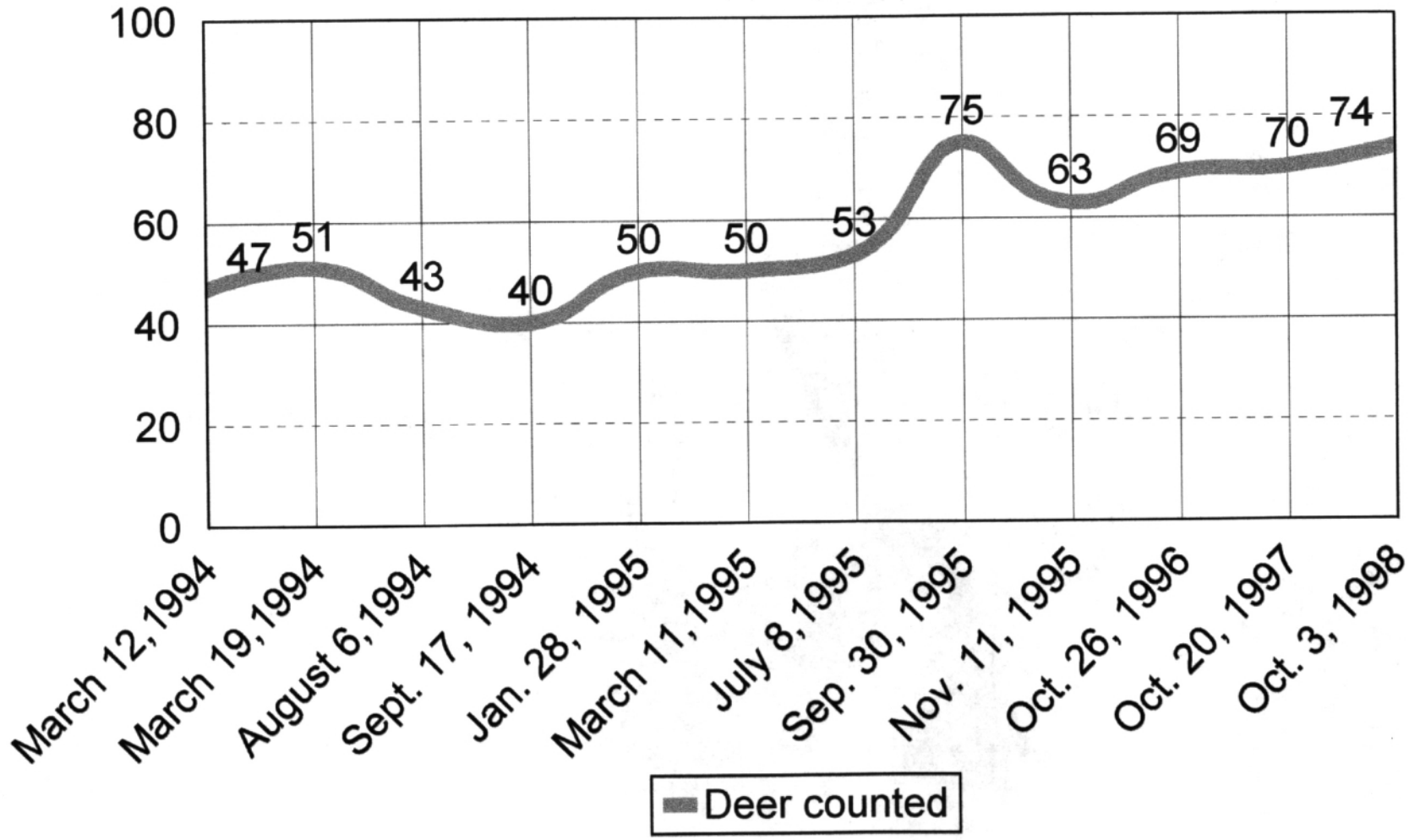
In July of 1999, Goddard employees were given an opportunity to view a preview of the research done for the Environmental Assessment by information provided via a website, GSFC Center Announcement No. 99-29 and advertised in various GSFC bulletin boards. Comments were solicited in with the Center posting. The cut-off date for those comments was August 13, 1999. The comment period concluded with 114 employees submitting comments. A summary chart of those comments is below.

In addition, a compilation of the basic comments, questions, and area of concern is contained in the table below with a cross reference of where it is addressed in the Environmental Assessment.

What are the goals for each animal?	Deer – Page 8 Geese – Page 9 Beaver – Page 9
Who will care for dogs in residence? Given food, shelter, cleaning, harsh weather. Who will maintain the electronic system? Will the Center "no dog" policy be changed?	*Due to many concerns of dogs in residence, this has been changed to dog working with trainer
Let the employees hunt the deer and let them have the meat.	Page 11, 12
Will a safety/shooting plan be advertised?	Page 11
Why not relocate deer to another hunted area?	Page 12
Why will antlerless (female) deer be targeted?	Page 11
What about birth control or sterilization for deer?	Page 13
Is consideration being given to the aesthetic value of the wildlife? Do not hunt the white deer. No goslings for the geese to raise.	Page 11
What about other euthanasia methods for deer and geese?	Deer – Page 14 Geese – Page 15
Why not hunt the geese?	Page 15
Will feral cats and other animals be addressed?	Page 5
What about control by natural predators?	Page 8-9

Local communities were also sent a letter advising them that a program was being developed and an Environment Assessment written. The letter gave the phone number for the preparer of this document. One phone call was received from a local homeowner's association inquiring about possible public hunting opportunities. They were advised of the proposed actions planned to be incorporated into this document and that public hunting was not likely. Website information was also forwarded to the City of Greenbelt Council through another Goddard forum. No preliminary comments were received.

White-tailed deer counts on NASA-GSFC



Source: NASA-GSFC

APPENDIX 1

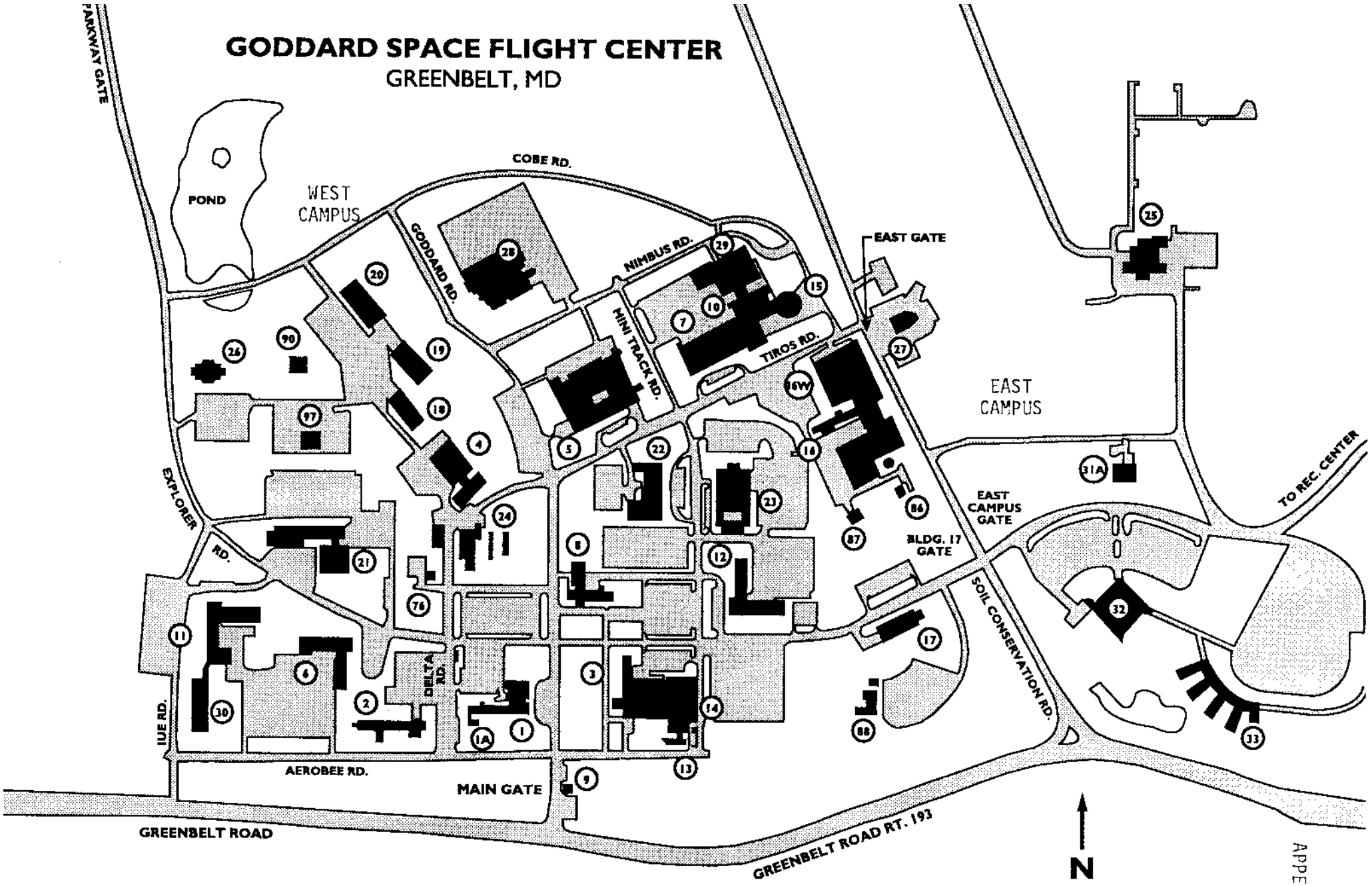
TREE REGENERATION IN SMALL FOREST PATCHES: INTERACTION OF BROWSING AND ABIOTIC FACTORS

April 1997

CONCLUSIONS

The experimental portion of this project addressed the recruitment and survival of tree seedlings both with and without the presence of deer. In the temporal scope of this study, white-tailed deer browsing does not appear to influence the short-term (one to three years) survivorship of small seedlings at GSFC. This does not indicate that deer browsing has no influence on regeneration in the GSFC woodlots. The extreme lack of understory, prevalence of browsed twigs, and low number of trees in small size classes attest to the impact of deer on the structure of the forest. Rather, we propose sequential controls on regeneration, whereby germination and establishment is controlled largely by microenvironment, and deer browsing exerts impacts on seedlings once they are established and growing into the shrub layer of the forest. Further tests of this hypothesis will require new experimental designs because the current status of the GSFC woodlot understory is so degraded that suitable sample sizes of shrub-level trees do not exist.

Seedling recruitment results from the temporal and spatial juncture of appropriate abiotic and biotic conditions. These conditions minimally include seed availability, a suitable physical microenvironment for germination and establishment, and escape from seed predation and seedling browsing. The first two of these three conditions were apparently met during each year of our experiment because a rather consistent number of seedlings (75, 75, and 83 during years one through three, respectively) was recruited each year. Our experiment was directed toward testing the impact of the third condition - seed predation and seedling browsing by white-tailed deer. Superficially, our results indicate that in 1994 the exclusion of white-tailed deer from experimental plots significantly increased recruitment rates. Through time, however, this result is inconsistent because closed and open plot recruitment rates were essentially equal in 1995 and 1996. We found no obvious biases in our field design (e.g. seed tree locations in relation to closed and open plots), and suggest that the temporal sequence of recruitment more likely reflects chance events in 1994. This interpretation is also consistent with our survivorship data which indicates no impact of browsing on seedling survival. We have noted that most of the tree species regenerating in our experimental plots have small, wind dispersed seeds. In contrast, chestnut oak is a canopy dominant whose contribution to seedling recruitment was relatively small - over three years only 13 individuals were recruited into both treatments combined. However, 11 of those recruits were found in closed plots. The effect of deer on seedling recruitment may thus be through seed predation of those heavy seeded mast species that are heavily favored by deer rather than browsing germinated plants of species whose seeds are generally not physically accessible by deer.


GODDARD SPACE FLIGHT CENTER
GREENBELT, MD
PARKWAY GATE
POND
WEST CAMPUS
COBE RD.
GODDARD RD.
NIMBUS RD.
MINI TRACK RD.
TIROS RD.
EAST GATE
EAST CAMPUS
EXPLORER RD.
IUE RD.
DELTA RD.
AEROBEE RD.
MAIN GATE
GREENBELT ROAD
GREENBELT ROAD RT. 193
EAST CAMPUS GATE
BLDG. 17 GATE
SOIL CONSERVATION RD.
TO REC. CENTER
N

APPENDIX 3

Area-wide Control of *Ixodes scapularis* as Measured by Three Sampling Units

Sites sampled	Units sampled	Tick stages	Tick Control (%) [1] 1996	1997	1998
1. Area	Deer	Adults	88	100	100
		Nymphs	100	100	100
2. Plots	Mice	Nymphs	100	80	90
		Larvae	81	77	92
	Drag	Adults	52	90	100
		Nymphs	78	83	94
		Larvae	93	100	98

[1] % Control = $\left[\frac{\text{Mean No. Ticks from Patuxent - Mean No. Ticks from NASA}}{\text{Mean No. Ticks from Patuxent}}\right]$ X 100, 3 months to 3 years

post initiation of permethrin treatment at NASA

APPENDIX 4

APPENDIX 5: RESPONSES TO COMMENTORS ON THE DRAFT ENVIRONMENTAL ASSESSMENT

Comment Submitted	Affiliation of Respondents	Section Eliciting Comment	Section/Rationale Addressing Comment
Action comments:			
1. The proposals are well researched and documented and are reasonable for implementation.	GSFC	Section 2.0	1. Appreciative of the supportive comments.
2. These actions are long overdue and are taking too long for implementation.	GSFC	Section 2.0	2. The Environmental Assessment has a specific process that needs to be adhered to.
3. Wouldn't it be cheaper to have a controlled bow hunt. I'm a hunter how can I participate?	GSFC	Section 2.0	3. There are a lot of issues to balance for a well populated Center, safety being the first and fairness to qualified hunters. Professional wildlife sharpshooters were evaluated as the best course of action.
4. Commission is satisfied that there are no negative affects to a federal resource. Announcements should be made to community of shootings.	National Capital Planning Commission	Sections 1.0 –4.0	4. Appropriate communications will be coordinated with any shootings.
5. Suggest calling document Wildlife Management Program rather than plan as actions will be on-going and adaptive to changing needs. Show how feedback will be made to community on program progress and changes	NASA Headquarters	Sections 1.0 –4.0	5. True that plan will be an on-going program. It is not specifically referred to as a plan. Section 2.0 does address adaptability to the actions. Center employees will be kept up to date by Web Site and community will have a Public Affairs Fact Sheet available to them
Research Site Comments:			1. It has always been a practice to consider the site for research proposals. Future research projects will be considered for consistency with stated wildlife management goals. Many actions with Canada geese need federal permits since they are protected under the Migratory Bird Act.
1. Site could be opened to research for high school students for geese.	P.G. County School teacher	Section 1.0	
2. On-going tick research on East campus would be affected by any immediate hunt.	Univ. of Maryland student	Section 2.0	2. Any culling would be coordinated with timing of research.

Comment Submitted	Affiliation of Respondents	Section Eliciting Comment	Section/Rationale Addressing Comment
Use of Non-lethal Methods: Deer			There has been no precipitateness to use lethal methods.
1. Consider contraception.	GSFC, City of Bowie	Section 2.0	1. There are no contraception management tools. Addressed in Section 2.0, IIa.
2. Consider wildlife adjacent corridors.	GSFC, City of Bowie	Section 2.0	2. For security reasons and federal property reasons the Center is completely fenced. There is little migration of animals. Our only neighbors are either major roadways or other Federal facilities. Our neighboring facilities manage overabundant deer with hunting. They do not want additional deer to manage.
3. Take animal group alternative ideas into consideration. Prejudiced toward hunting.	GSFC	Section 2.0	3. Materials from many groups were utilized in this research including workshop proceedings. They are referenced under Section 6.0.
4. Do nothing until other means become available or let natural processes take place.	GSFC	Section 2.0 and 4.0	4. The do nothing approach has been in place over the history of GSFC. This approach has led us to scenario we have today of overabundant deer, geese, and beaver. This is addressed in Section 4.0.
5. Sharpshooting may only wound the deer.	GSFC	Section 2.0	5. Professional wildlife sharpshooters would be hired who know how to accomplish the goal with the most humane outcome for everyone.

Comment Submitted	Affiliation of Respondents	Section Eliciting Comment	Section/Rationale Addressing Comment
Beaver			
1. Modifying the habitat should be sufficient.	GSFC, City of Bowie	Section 2.0	1. The proposed action sets forth a series of actions beginning with habitat mods. If this does not keep the damage to a tolerable level, then lethal trapping would be utilized under state law.
2. Set aside a location for beaver on your own property which will not interfere with water flow issues.	NASA HQ	Section 2.0	2. Unfortunately there are no areas where beaver activity does not back up drainage. Other areas beside the West campus main pond have to be cleared of debris to allow proper water flow.
3. Is neutering beaver an option?	GSFC	Section 2.0	3. This has been explored in a report I read and ruled out as an option. It is labor intensive and taxing on the animal and finding a surgeon is difficult. It also does not prevent damage.
Geese			
1. Geese should not be used for food or game.	GSFC, City of Bowie	Section 2.0	1. At this time non-lethal are proposed. However, should the actions prove to be fruitless, humane euthanizing and use for food donation is an option.
2. Addling creates a public health concern of its own with rotten eggs. Better to remove and replace eggs with substitute eggs.	City of Bowie	Section 2.0	2. While there are articles of this option being explored, it is inconsistent with our permitting from the U.S. Fish and Wildlife Service. The permit does however state that eggs should be removed after 45 days and disposed of, therefore, should alleviate any concerns for rotting eggs.
3. Who will care for the dogs for proper health care?	GSFC	Section 2.0	3. The dogs will remain the responsibility of the Contractor hired for dog herding.

Comment Submitted	Affiliation of Respondents	Section Eliciting Comment	Section/Rationale Addressing Comment
Other comments on geese:			
1. Could round up, euthanize and donate goose meat through GEWA and Harvest for the Hungry Foundation. Would be less costly too.	GSFC	Section 2.0	1. Lethal actions would be considered if non-lethal prove to be ineffective.
2. Why not hunt geese if hunting deer?	GSFC	Section 2.0	2. There are quite some different parameters with goose hunts and evaluated as unsafe in Section 2.0, IIb.
3. Should let all the mowed areas grow up to natural meadows and keep only one area mowed for gatherings.	GSFC	Section 2.0	3. There is a perception of untidiness with unmowed lawn and a two sided benefit in that long grasses are more conducive to harboring insects.
4. New executive orders 13112 and 13148 have provisions for beneficial landscaping should be considered with any replanting projects.	NASA Headquarters	Section 2.0	4. Executive orders will be taken into account for any replanting projects.