

DECISION

ENVIRONMENTAL ASSESSMENT: REDUCING CANADA GOOSE DAMAGE THROUGHOUT THE STATE OF RHODE ISLAND

I. PURPOSE

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) program, in cooperation with the United States Fish and Wildlife Service (USFWS) has prepared an Environmental Assessment (EA) to analyze the potential environmental and social impacts to the quality of the human environment from resolving damage, including conflicts and threats, to agricultural resources, property, natural resources, and human safety associated with Canada geese (*Branta canadensis*) (USDA 2010). The EA documents the need for goose damage management in the State and assesses potential impacts on the human environment of three alternatives to address that need. WS' proposed action in the EA would continue an integrated damage management program to fully address the need to manage damage and threats associated with geese in the State.

The EA evaluated the issues and alternatives associated with WS' potential participation in managing damage and threats caused by geese in the State. The EA was prepared by WS to determine if the proposed action could have a significant impact on the quality of the human environment. Specifically, the EA was prepared to: 1) facilitate planning and interagency coordination, 2) streamline program management, 3) evaluate the potential environmental consequences of the alternatives related to the issues of managing damage caused by geese, and 4) clearly communicate to the public the analysis of individual and cumulative impacts.

II. NEED FOR ACTION

The need for action arises from requests for assistance received by WS to reduce and prevent damage associated with geese from occurring to four major categories: agricultural resources, natural resources, property, and threats to human safety. WS only conducts goose damage management after receiving a request for assistance. Before initiating goose damage management activities in the State, a Memorandum of Understanding, cooperative service agreement, or other comparable document would be signed between WS and the cooperating entity which lists all the methods the property owner or manager will allow to be used on property they own and/or manage.

Most requests for WS' assistance are associated with suburban areas where geese congregate during migration periods and during nesting periods. Those requests for assistance are associated with fecal accumulations in public-use areas, the overgrazing of vegetation, hazards posed to aircraft from bird strikes, and from the aggressive behavior of geese. Although not commonly reported to WS, geese can cause damage to agricultural resources in the State primarily from lost revenue associated with geese consuming sprouting plants and the trampling of emerging plants as geese forage. Threats to natural resources associated with large concentrations of geese also occur in the State. A large concentration of geese can contribute to nutrient loading in wetlands from fecal droppings.

WS' activities would only be conducted when requested and only when damage or a threat is occurring to agricultural resources, natural resources, property, or posing a threat to human health and safety. WS may also be requested to participate in disease surveillance and monitoring in the event of a disease outbreak or potential outbreak in a goose population.

III. SCOPE OF ANALYSES IN THE EA

The EA evaluates goose damage management as conducted by WS to reduce threats to human health and safety and to resolve damage to property, natural resources, and agricultural resources wherever such management is requested by a cooperator. If the analyses in the EA indicates the preparation of an Environmental Impact Statement (EIS) is not warranted and a Finding of No Significant Impact (FONSI) is signed by the decision-maker for the EA, the analyses in the EA would remain valid until WS determines that new needs for action, changed conditions, new issues, or new alternatives having different potential environmental impacts must be analyzed. The analyses in the EA are intended to apply to any action taken by WS to alleviate damage or threats of damage associated with Canada geese that may occur in any locale and at any time within the State of Rhode Island.

The USFWS was a cooperating agency with WS in developing the EA to analyze cumulative take of geese and to ensure compliance with the National Environmental Policy Act (NEPA). The USFWS has jurisdiction over the management of migratory birds and has specialized expertise in identifying and quantifying potential adverse affects to the human environment from bird damage management activities. The analyses in the EA will ensure the USFWS compliance with the NEPA for the issuance of depredation permits for the take of geese in the State.

The EA was made available to the public for review and comment by a legal notice published for three consecutive days in the *Providence Journal* newspaper beginning on April 27, 2010. A notice of availability and the EA were also made available for public review and comment on the APHIS website at http://www.aphis.usda.gov/wildlife_damage/nepa.shtml beginning on April 23, 2010. A letter of availability was also mailed directly to agencies, organizations, and individuals with probable interest in goose damage management in the State. The public involvement process ended on June 4, 2010. WS received three comment letters during the public comment period. WS' responses to comments are presented in Appendix A of this Decision.

IV. DECISIONS TO BE MADE

Based on the scope of the EA, the decisions to be made are: 1) should WS conduct Canada goose damage management to alleviate damage to agriculture, property, natural resources, and threats to human health and safety, 2) should the Migratory Bird Program in USFWS Region 5 issue depredation permits to WS and other entities to conduct Canada goose damage management activities, 3) should WS conduct disease surveillance and monitoring in the goose population when requested, 4) should WS implement an integrated wildlife damage management strategy, including technical assistance and direct operational assistance, to meet the need for goose damage management in Rhode Island, 5) if not, should WS attempt to implement one of the alternatives to an integrated damage management strategy as described in the EA, and 6) would the proposed action result in adverse impacts to the environment requiring the preparation of an EIS.

V. RELATIONSHIP OF THE EA TO OTHER ENVIRONMENTAL DOCUMENTS

WS has developed a programmatic Final Environmental Impact Statement (FEIS) that addressed the need for wildlife damage management (USDA 1997). The FEIS contains a detailed discussion of the potential impacts to the human environment from wildlife damage management methods and techniques employed by WS, including methods used to manage damage associated with geese. Pertinent information in the FEIS has been incorporated into the EA and this decision document by reference.

The USFWS has developed an FEIS to address the need to manage resident Canada goose populations (USFWS 2005). The FEIS evaluates the potential impacts associated with implementing alternative

strategies to manage increasing resident Canada goose populations to alleviate damage and threats. Information from the FEIS has been incorporated into the EA and this Decision document by reference.

VI. AUTHORITY AND COMPLIANCE

WS is authorized by law to reduce damage caused by wildlife through the Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C. 426-426b), as amended and the Act of December 22, 1987 (101 Stat. 1329-331, 7 U.S.C. 426c). Management of migratory birds, including Canada geese, is the responsibility of the USFWS under the Migratory Bird Treaty Act (MBTA). As the authority for the management of geese, the USFWS was a cooperating agency in the development of the EA and provided input throughout the EA preparation process to ensure an interdisciplinary approach according to the NEPA and agency mandates, policies, and regulations. The Rhode Island Department of Environmental Management (RIDEM) is responsible for managing wildlife in the State of Rhode Island, including geese. Information from the USFWS and the RIDEM has been provided to WS to assist in the analysis of potential impacts of WS' proposed activities on goose populations in the State.

The EA and this Decision ensures WS' actions comply with the NEPA, with the Council on Environmental Quality guidelines (40 CFR 1500), and with APHIS' NEPA implementing regulations (7 CFR 372). All Canada goose damage management activities, including disposal requirements, are conducted consistent with: 1) the Endangered Species Act of 1973, 2) the MBTA, 3) Executive Order (EO) 12898¹, 4) EO 13045², 5) EO 13186³, 6) the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), and 7) applicable Federal, State, and local laws, regulations and policies, including WS' Directives.

VII. AFFECTED ENVIRONMENT

Upon receiving a request for assistance, Canada goose damage management activities could be conducted on Federal, State, tribal, municipal, and private properties in Rhode Island. The areas of the proposed action include, but are not limited to, property on or adjacent to airports, golf courses, athletic fields, recreational areas, swimming beaches, parks, corporate complexes, subdivisions, businesses, industrial parks, schools, agricultural areas, wetlands, restoration sites, and cemeteries. The proposed action may be conducted on properties held in private, local, State, or Federal ownership throughout Rhode Island. Goose damage management would be conducted when requested by a landowner or manager and only on properties where a cooperative service agreement or other comparable document has been signed between WS and the cooperating entity.

VIII. ISSUES ADDRESSED IN THE ANALYSIS OF ALTERNATIVES

Issues related to wildlife damage management were initially identified and defined during the development of WS' programmatic FEIS (USDA 1997). Issues related to Canada goose damage management in Rhode Island were defined and preliminary alternatives were identified through consultation with the USFWS and with the RIDEM. The EA was also made available to the public for review and comment through notices published in local media and through direct notification of interested parties.

¹ Executive Order 12898 promotes the fair treatment of people of all races, income levels, and cultures with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

² Executive Order 13045 ensures the protection of children from environmental health and safety risks since children may suffer disproportionately from those risks.

³ Executive Order 13186 directs federal agencies to protect migratory birds and strengthen migratory bird conservation by identifying and implementing strategies that promote conservation and minimize the take of migratory birds through enhanced collaboration. A national-level MOU between the USFWS and WS is being developed to facilitate the implementation of Executive Order 13186.

Chapter 2 of the EA describes in detail the issues considered and evaluated in the EA (USDA 2010). The following issues were identified as important to the scope of the analysis (40 CFR 1508.25) with each alternative evaluated in the EA relative to the impacts on the major issues:

- Issue 1 - Effects on Canada Goose Populations
- Issue 2 - Effectiveness of Canada Goose Damage Management Methods
- Issue 3 - Effects on Non-target Wildlife Species Populations, Including T&E Species
- Issue 4 - Humaneness and Animal Welfare Concerns of Methods
- Issue 5 - Effects on the Aesthetic Values of Canada Geese
- Issue 6 - Effects of Management Methods on Human Health and Safety
- Issue 7 - Effects on the Regulated Harvest of Canada Geese

IX. ISSUES CONSIDERED BUT NOT ANALYZED IN DETAIL WITH RATIONALE

In addition to those issues analyzed in detail, several issues were identified during the development of the EA but were not considered in detail. The rationale for the decision not to analyze those issues in detail is discussed in the EA. Those issues not analyzed in detail were:

- Appropriateness of Preparing an EA For Such a Large Area
- WS' Impact on Biodiversity
- A Loss Threshold Should Be Established Before Allowing Lethal Methods
- Canada Goose Damage Management Should Not Occur at Taxpayer Expense
- Cost Effectiveness of Management Methods
- Canada Goose Damage Should Be Managed By Private Nuisance Wildlife Control Agents
- Effects from the Use of Lead Ammunition in Firearms
- Impacts of Dispersing Geese to other Areas
- A Site Specific Analysis Should be Made for Every Location Where Goose Damage Management Could Occur
- Effects on Human Health from Consumption of Geese Donated

X. DESCRIPTION OF THE ALTERNATIVES

The following three alternatives were developed to respond to the issues identified in Chapter 2 of the EA (USDA 2010). A detailed discussion of the effects of the alternatives on the issues is described in the EA under Chapter 4; below is a summary of the alternatives.

Alternative 1 – No Canada Goose Damage Management Conducted by WS

Under the no involvement alternative, WS would not be involved with any aspect of Canada goose damage management activities in Rhode Island. All requests for assistance received by WS would be referred to the USFWS, the RIDEM, and/or other entities. The take of Canada geese could continue to occur under this alternative when damage or threats were occurring in accordance with depredation permits issued by the USFWS and the RIDEM as well as under the depredation orders and during the regulated hunting season in the State. Most of the methods described in Appendix B of the EA under this alternative to alleviate goose damage and threats would be available under any of the alternatives. The only method that would not be available to manage damage caused by geese under this alternative would be the immobilizing drug alpha chloralose which is only available for use by WS.

Alternative 2 - Canada Goose Damage Management by WS through Technical Assistance Only

Under the technical assistance only alternative, WS would address every request for assistance with technical assistance only. Technical assistance would provide those persons seeking assistance with information and recommendations on goose damage management that those cooperators could employ without WS' direct involvement in the action. Technical assistance could be employed through personal or telephone consultations and through site visits. Under this alternative, the immediate burden of resolving threats or damage associated with geese would be placed on those persons experiencing damage. Those persons could employ those methods recommended by WS, could employ other methods, or could take no further action.

Canada geese could still be lethally taken to alleviate damage under this alternative when committing or about to commit damage or posing a human health and safety threat in accordance with depredation permits issued by the USFWS and the RIDEM or under the established depredation orders. In addition, geese could continue to be taken during the regulated hunting seasons in the State. Similar to Alternative 1, the immobilizing drug alpha chloralose would not be available under this alternative to those persons experiencing goose damage. All other methods described in Appendix B of the EA would be available to those persons experiencing damage.

Alternative 3 - Continuing the Current Integrated Approach to Managing Canada Goose Damage (Proposed Action/No Action)

The proposed action would continue the current program of employing an integrated damage management approach using methods, as appropriate, to reduce damage associated with geese in the State. An integrated damage management strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on people, other species, and the environment. Non-lethal methods would be given first consideration in the formulation of each damage management strategy, and would be recommended or implemented when practical and effective before recommending or implementing lethal methods. However, non-lethal methods would not always be applied as a first response to each damage problem. The most appropriate response could often be a combination of non-lethal and lethal methods, or there could be instances where application of lethal methods alone would be the most appropriate strategy.

All methods addressed in Appendix B of the EA could be employed by WS to resolve requests for assistance to manage damage associated with geese in the State. Using the WS Decision model discussed in the EA, WS would employ methods singularly or in combination in an integrated approach to alleviate damage caused by Canada geese.

XI. ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL WITH RATIONALE

Additional alternatives were also evaluated but were not considered in detail in the EA with rationale provided in the EA (USDA 2010). The alternatives analyzed but not in detail included:

- Non-lethal Methods Implemented Before Lethal Methods
- Use of Lethal Methods Only
- Trap and Translocate Geese Only
- Use of Non-lethal Methods Only to Resolve Damage or Threats
- Reducing Damage by Managing Canada Goose Populations through the Use of Reproductive Inhibitors

XII. STANDARD OPERATING PROCEDURES

The current WS program, nationwide and in Rhode Island, uses many standard operating procedures. Standard operating procedures are discussed in detail in Chapter 5 of WS' programmatic FEIS (USDA 1997) and in Chapter 3 of the EA (USDA 2010). Those Standard Operating Procedures would be incorporated into activities conducted by WS when addressing goose damage and threats in Rhode Island under the proposed action alternative (Alternative 3) and when applicable, under the technical assistance alternative (Alternative 2). If the no involvement by WS alternative (Alternative 1) is selected, the lack of assistance by WS would preclude the employment or recommendation of those Standard Operating Procedures addressed in the EA by WS.

XIII. ENVIRONMENTAL CONSEQUENCES FOR ISSUES ANALYZED IN DETAIL

The EA analyzes the environmental consequences of each alternative as that alternative relates to the issues identified to provide information needed for making informed decisions in selecting the appropriate alternative to address the need for action. The following resource values in Rhode Island are not expected to be significantly impacted by any of the alternatives analyzed in the EA: soils, geology, minerals, water quality/quantity, flood plains, wetlands, critical habitats (areas listed in threatened and endangered (T&E) species recovery plans), visual resources, air quality, prime and unique farmlands, aquatic resources, timber, and range. The activities proposed in the alternatives would have a negligible effect on atmospheric conditions including the global climate. Meaningful direct or indirect emissions of greenhouse gases would not occur as a result of any of the alternatives. Those alternatives would meet the requirements of applicable laws, regulations, and Executive Orders, including the Clean Air Act and Executive Order 13514.

Chapter 4 of the EA analyzes the environmental consequences of each alternative in comparison to determine the extent of actual or potential impacts on those major issues identified in the EA. The proposed action/no action alternative serves as the baseline for the analysis and the comparison of expected impacts among the alternatives. The analysis also takes into consideration mandates, directives, and the procedures of WS, the USFWS, and the RIDEM. The analyses in Chapter 4 of the EA indicate the potential impacts to the quality of the human environment would be similar across the alternatives.

Issue 1 - Effects on Canada Goose Populations

Under the proposed action, WS would incorporate non-lethal and lethal methods described in Appendix B of the EA in an integrated approach in which all or a combination of methods could be employed to resolve a request for assistance. WS would recommend and operational employ both non-lethal and lethal methods, as governed by Federal, State, and local laws and regulations under the proposed action.

Non-lethal methods can disperse or otherwise make an area unattractive to birds that are causing damage; thereby, reducing the presence of birds at the site and potentially the immediate area around the site where non-lethal methods are employed. Non-lethal methods would be given priority when addressing requests for assistance (WS Directive 2.101). However, non-lethal methods would not necessarily be employed to resolve every request for assistance if deemed inappropriate by WS' personnel using the WS Decision Model. Non-lethal methods are used to excluded, harass, and disperse target wildlife from areas where damage or threats are occurring. When effective, non-lethal methods would disperse birds from the area resulting in a reduction in the presence of those birds at the site where those methods were employed. From FY 2005 through FY 2008, WS employed non-lethal methods to harass and disperse 1,727 geese in Rhode Island as part of an integrated approach to managing damage and threats which is an average of 431 geese dispersed per year. Non-lethal methods are generally regarded as having minimal impacts on overall populations of wildlife since those species are unharmed. The continued use of non-lethal

methods often leads to the habituation of birds to those methods which can decrease the effectiveness of those methods. Lethal methods are often employed to reinforce non-lethal methods and to remove birds that have been identified as causing damage or posing a threat to human safety. The use of lethal methods would result in local reductions of birds in the area where damage or threats were occurring. The number of birds removed from the population using lethal methods would be dependent on the number of requests for assistance received, the number of birds involved with the associated damage or threat, and the efficacy of methods employed.

Canada geese that could be taken by WS under the proposed action could be taken by those persons experiencing damage or threats in the absence of WS' direct involvement since the take of geese can occur when a depredation permit has been issued by the USFWS pursuant to the MBTA and a permit has been issued by the RIDEM. In addition, Canada geese could be lethally taken to alleviate damage or reduce threats under the depredations orders and/or during the regulated hunting seasons for geese in the State. Since the lack of WS' direct involvement does not preclude the taking of geese by those persons experiencing damage or threats, WS' involvement in the taking of those geese under the proposed action would not be additive to the number of geese that could be taken by other entities in the absence of WS' involvement. In addition, most non-lethal and lethal methods available for resolving damage or threats associated with geese would be available under any of the alternatives. The immobilizing drug alpha chloralose would be the only method that would not be available under all of the alternatives. The use of alpha chloralose would only be available under the proposed action alternative since the product is only available for use by WS' personnel. Therefore, WS' use of those methods available under all of the alternatives would not be additive to the environmental status quo since those methods could be employed by any entity experiencing damage or threats caused by geese. Based on the evaluation in the EA (USDA 2010), the availability of alpha chloralose to manage damage or threats of damage associated with geese under the proposed action would not pose significant environmental risks when used by trained WS' personnel and in accordance with the use guidelines.

Resident Canada Geese

Under the proposed action, based on a review of previous activities conducted by WS to alleviate goose damage and in anticipation of an increase in requests for lethal take, WS anticipates that future lethal take would not exceed 500 geese annually. Of those 500 geese, up to 150 could be taken during those periods when geese present in the State could be considered as migratory geese. In addition, up to 500 Canada goose nests could be destroyed annually by WS to alleviate damage or threats of damage in Rhode Island. All take by WS would occur pursuant to the allowed take defined under depredation permits issued by the USFWS and the RIDEM. WS may also be requested to assist with sampling and managing the spread of diseases found in Canada goose populations. In the case of a disease outbreak, WS could lethally take geese for sampling and/or to prevent the further spread of diseases. However, sampling is more likely to occur after a mortality event or after geese have been taken to alleviate damage or have been harvested during the annual waterfowl hunting seasons.

WS' take is monitored by comparing numbers of birds killed with overall populations or trends in populations to assure the magnitude of take is maintained below the level that would cause significant adverse impacts to the viability of native species populations (USDA 1997). Magnitude is defined as a measure of the number of animals killed in relation to their abundance. In the analysis, magnitude is evaluated first in terms of total take or population trend, then in terms of WS' proposed annual take of geese. Magnitude is determined either quantitatively or qualitatively. The quantitative method is more rigorous and used when allowable take, population level, and take data is available. Qualitative methods are based on population trends and take data or regional population trends and population modeling. The analyses in the EA were based on data derived from the Breeding Bird Survey (BBS), the Christmas Bird Count (CBC), annual waterfowl surveys, and annual harvest data.

In 2009, the resident goose population was estimated at 3,627 geese in the State (Klimstra and Padding 2009). In 1999, the population objective for resident Canada geese in the State was 3,000 individuals (Atlantic Flyway Council 1999). Canada geese can be harvested during regulated seasons in the State. Under frameworks developed by the USFWS, the RIDEM allows Canada geese to be harvested during a September hunting season, the regular waterfowl season, and during a late Canada goose season. To manage increasing populations of resident geese across their range, the USFWS established a framework that allowed the States to implement a harvest season in September which was intended to target resident geese specifically. During the September hunting season in 2007, an estimated 200 geese were harvested statewide (Raftovich et al. 2009). In 2008, the USFWS currently estimates that 1,400 geese were harvested in the State during the September season for geese (Raftovich et al. 2009). During the regular waterfowl season, an estimated 4,800 geese were harvested in the State in 2007 compared to 2,500 geese harvested in the 2008 (Raftovich et al. 2009). During the late goose season in the State, the USFWS estimated 100 geese were harvested during the 2007 season while 200 geese were harvested during the 2008 season (Raftovich et al. 2009).

Most requests for assistance received by WS to address damage caused by Canada geese occurs during those months when geese present in the State are considered resident. From FY 2006 through FY 2009, more than 74% of geese taken by WS in Rhode Island have been taken during the time of year (April through September) when geese are considered resident birds. Distinguishing resident and migratory geese is not possible through visual identification. However, based on those requests received and the type of damage occurring, those geese addressed by WS from FY 2005 through FY 2009 were likely resident geese (*i.e.*, present in the State all year).

WS lethally removed a total of 509 Canada geese in Rhode Island from FY 2005 through FY 2009 which is an average of 102 geese taken by WS annually. WS' highest level of take occurred in FY 2007 when 151 geese were lethally taken to alleviate damage. WS' take of 151 geese in FY 2007 represented 5.0% of the estimated statewide goose population in the State during 2007 of 3,050 geese.

From 2005 through 2008, a total of 2,200 geese were harvested in the State during the September hunting season intended to target resident populations of Canada geese. The highest level of take during the September season occurred during the 2008 season when 1,400 geese were estimated to be harvested in the State. Based on a resident goose population of 3,242 geese estimated in the State during 2008, the take of 1,400 geese during the September season in 2008 which is intended to target resident geese would represent nearly 46% of the estimated statewide population. Despite harvesting nearly 46% of the estimated resident Canada goose population in the State, the number of geese estimated to be present in the State during the breeding season the following year in 2009 increased to 3,637 geese. The take of geese by WS, the take of geese during the September season, and depredation take in 2008 accounted for nearly 54.8% of the statewide resident goose population. Despite the take of 54.8% of the estimated goose population in the State during 2008, the 2009 breeding goose estimate of 3,627 geese was higher than the 2008 estimate of 3,242 geese. The current levels of take during those periods when geese taken are resident in the State have not resulted in declines in the resident goose population in the State.

WS' take of geese to alleviate damage from FY 2005 through FY 2009 represented 2.8% of the total take of geese that has occurred in the State from 2005 through 2008. WS' take of geese to alleviate damage has been a minor component of the total number of geese taken in the State during the regulated harvest seasons and the take of geese under depredation permits or depredation orders. Resident goose populations in the State continue to increase despite the take of geese by WS to alleviate damage, take during the regulated hunting seasons, and the take of geese under the depredation orders and depredation permits.

Impacts due to nest and egg removal and destruction would have little adverse impact on the resident goose population in Rhode Island. Nest and egg destruction methods are considered non-lethal when conducted before the development of an embryo. Additionally, geese are a long lived species and have the ability to identify areas with regular human disturbance and low reproductive success which causes them to relocate and nest elsewhere when confronted with repeated nest failure. Although there may be reduced fecundity for the individuals affected, this activity has no long term effect on breeding adult geese. Nest and egg removal is not used by WS as a population management method. This method is used by WS to inhibit nesting in an area experiencing damage due to the nesting activity and is employed only at the localized level. Treatment of 95% of all Canada goose eggs each year would result in only a 25% reduction in the population over 10 years (Allan et al. 1995). The resident Canada goose management FEIS developed by the USFWS concluded that a nest and egg depredation order would have minimal impacts on goose populations with only localized reductions in the number of geese occurring (USFWS 2005).

Migratory Canada Geese

In 2007, an estimated 4,900 geese were taken during the regular and late hunting seasons for geese in the State (Raftovich et al. 2009). An estimated 2,700 geese were harvested in both seasons during the 2008 season (Raftovich et al. 2009).

From FY 2006 through FY 2009, a total of 111 geese (an average of less than 28 geese per year) have been lethally taken by WS in the State during the period when geese present in the State could be considered migratory. However, based on increasing requests for assistance to manage geese, WS may be required to lethally take geese during those months when geese could be considered migratory if deemed appropriate through the use of the WS Decision Model. WS anticipates that requests for the lethal take of geese during those months when geese are considered migratory will occur primarily at airports where geese can pose a threat to human safety and to property. However, requests could be received to reduce damage or threats to other resources. Based on an increase in the number of requests received for the lethal take of geese during those periods of time when geese present in the State would be considered migratory, WS may take up to 150 geese during those periods when geese could be considered migratory.

All take by WS occurs through the issuance of a depredation permit issued by the USFWS which is reported annually to the USFWS. All take of geese during the hunting seasons occur under frameworks established by the USFWS. Take by other entities in the State occurs under depredation permits or depredation orders established by the USFWS with the requirement that take be reported to the USFWS. Therefore, the permitting of the take by the USFWS ensures cumulative take is considered as part of management objectives for Canada geese. WS' take of up to 150 geese that could be considered migratory annually would have represented 3.1% of the number of geese harvested in the State during the 2007 harvest season and 5.6% of the number of geese harvested in the State during the 2008 hunting season. The magnitude of an annual take of up to 5.6% of the number of geese harvested in the State could be considered low. No take of migratory geese will occur by WS without a depredation permit issued by the USFWS. Therefore, WS' take will only occur at the discretion of the USFWS after population objectives for geese are considered.

Issue 2 - Effectiveness of Canada Goose Damage Management Methods

The methods available to those persons experiencing damage would be similar across the alternatives analyzed in detail. The only method that would not be available under all the alternatives analyzed in detail would be the use of alpha chloralose which is restricted to use by personnel of WS only. Alpha chloralose would only be available and employed to alleviate damage or threats of damage under the proposed action alternative.

Since those methods available for resolving goose damage would be available to those experiencing damage or threats under all the alternatives, the effectiveness of those methods when used as intended would be similar amongst the alternatives. A common issue raised is that the use of lethal methods is ineffective because additional geese are likely to return to the area, either after removal occurs or the following year when birds return to the area to nest which gives the impression of creating a financial incentive to continue the use of only lethal methods. This assumes geese only return to an area where damage was occurring if lethal methods are used. However, the use of non-lethal methods is also often temporary which could result in geese returning to an area where damage was occurring once those methods are no longer used. The common factor when employing any method is that geese will return if suitable habitat continues to exist at the location where damage was occurring and goose densities are sufficient to occupy all available habitats.

Dispersing geese using pyrotechnics, repellents, border collies, or any other non-lethal method often requires repeated application to discourage geese which increases costs, moves geese to other areas where they could cause damage, and are temporary if habitat conditions remain unchanged. Dispersing and the translocating of geese could be viewed as moving a problem from one area to another which would require addressing damage caused by those geese at another location. WS' recommendation of or use of techniques to modifying existing habitat or making areas unattractive to geese is discussed in Appendix B of the EA. WS' objective is to respond to request for assistance with the most effective methods and to provide for the long-term solution to the problem using WS' Decision Model to adapt methods in an integrated approach to managing goose damage that is agreed upon by the cooperator.

As part of an integrated approach to managing goose damage, WS would have the ability to adapt methods to damage situations to effectively reduce or prevent damage from occurring. Under the proposed integrated approach, all methods, individually or in combination, could be employed as deemed appropriate through WS' Decision Model to address requests for assistance. WS' objective when receiving a request for assistance under the proposed action is to reduce damage and threats to human safety or to prevent damage from occurring using an integrated approach to managing goose damage. Therefore, under the proposed action, WS would employ methods adaptively to achieve that objective.

Issue 3 - Effects on Non-target Wildlife Species Populations, Including T&E Species

Another issue often raised is the potential impacts to populations of wildlife that could be taken as non-targets during damage management activities. While every effort is made to minimize the risks of lethally taking non-target wildlife, the potential does exist for the unintentional take of non-targets during damage management activities. Since FY 2004, no non-targets are known to have been killed by WS during previous Canada goose damage management activities using an integrated approach. Methods available to address goose damage would be similar across all the alternatives. Therefore, risks to non-targets from the use of those methods would be similar across the alternatives analyzed in detail. The only method available under the proposed action that would not be available under any of the other alternatives would be alpha chloralose. Although some risks to non-targets do occur from the use of alpha chloralose, those risks are minimal when the product is used by trained personnel in accordance with WS Directive 2.430 and use guidelines. Based on information in the EA (USDA 2010), the use patterns of alpha chloralose would not pose increased risks to non-targets.

Under the no involvement by WS alternative, WS would not be directly involved with any aspect of goose damage management; therefore, no direct impacts to non-targets would occur from WS. Under the technical assistance only alternative, WS could provide information on the proper use of methods and provide demonstration on the use of methods but would not be directly involved with using methods to alleviate goose damage or threats. Similar to the no WS involvement alternative, under the technical

assistance alternative, if methods are applied as intended and with regard for non-target hazards, those methods would not result in the decline in non-target species populations. If requestors are provided technical assistance but do not implement any of the recommended actions and takes no further action, the potential impacts to non-targets would be lower compared to the proposed action. If those persons requesting assistance implement recommended methods appropriately and as instructed or demonstrated, the potential impacts to non-targets would be similar to the proposed action. Methods or techniques not implemented as recommended or used inappropriately would likely increase risks to non-targets. When employing direct operational assistance under the proposed action alternative, WS could employ methods and use techniques which would avoid non-target take as described in Chapter 3 of the EA under the Standard Operating Procedures and those measures and procedures discussed in WS' programmatic FEIS (USDA 1997).

The ability to reduce damage and threats caused by geese would be variable based upon the skills and abilities of the person implementing damage management actions under Alternative 1 and Alternative 2. If those methods available are applied as intended, risks to non-targets would be minimal to non-existent. If methods available are applied incorrectly or applied without knowledge of goose behavior, risks to non-target wildlife would be higher under any of the alternatives. If frustration from the lack of available assistance under Alternative 1 and Alternative 2 causes those persons experiencing goose damage to use methods that are not legally available for use, risks to non-targets would be higher under those alternatives. People have resorted to the use of illegal methods to resolve wildlife damage that have resulted in the lethal take of non-target wildlife (USDA 1997, White et al. 1989, USFWS 2001, Food and Drug Administration 2003). Under the proposed action alternative, those persons could request direct operational assistance from WS to reduce damage and threats occurring which increases the likelihood that non-target species will be unaffected by damage management activities.

Based on a review of those T&E species listed in the State during the development of the EA (see Appendix C in the EA), WS determined that activities conducted pursuant to the proposed action will not likely adversely affect those species listed in the State by the USFWS and the National Marine Fisheries Services nor their critical habitats that were addressed in the Biological Opinion issued by the USFWS on WS' programmatic activities (USDA 1997). In addition, WS has determined the proposed action will have no effect on those T&E species listed in the State that were not addressed in the Biological Opinion (see USDA 1997 for a complete list of species addressed in the Biological Opinion). WS has also determined that the use of alpha chloralose, lasers, and nicarbazin will have no effect on any T&E species listed within the State based on their use patterns. Based on a review of the proposed action and the methods available under the proposed action, WS has determined that the proposed goose damage management program will have no effect on any of the species listed by the RIDEM in the State.

Issue 4 - Humaneness and Animal Welfare Concerns of Methods

The issue of humaneness was also analyzed in detail in relationship to the alternatives. Since many methods addressed in Appendix B of the EA are available under all the alternatives, the issue of method humaneness would be similar for those methods across all the alternatives. As stated previously alpha chloralose is the only method that would not be available under all the alternatives. The ability of WS to provide direct operational assistance under the proposed action alternative would insure methods are employed by WS as humanely as possible. Under the other alternatives, methods could be used inhumanely if used inappropriately or without consideration of goose behavior. However, most methods, when used as intended, would be considered humane and when attended to appropriately, would not increase distress of geese.

Issue 5 - Effects on the Aesthetic Values of Canada Geese

Birds often provide aesthetic enjoyment to many people in the State through observations, photographing, and knowing they exist as part of the natural environment. Under all the alternatives, methods available that could be employed are intended to make resources unavailable or unattractive. Therefore, the use of methods often results in the removal of geese from the area where damage is occurring or the dispersal of geese from an area. Since methods available are similar across the alternatives, the use of those methods would have similar potential impacts on the aesthetics of geese. However, even under the proposed action alternative, the dispersal and/or take of geese under the alternatives will not reach a magnitude that would prevent the ability to view geese outside of the area where damage was occurring. The effects on the aesthetic values of geese would therefore be similar across the alternatives and would be minimal.

Issue 6 - Effects of Management Methods on Human Health and Safety

The threats to human safety of methods available would be similar across the alternatives since those methods would be available across the alternatives. However, the expertise of WS' employees in using those methods available likely will reduce threats to human safety since WS' employees are trained and knowledgeable in the use of those methods. If methods are used incorrectly or without regard for human safety, risks to human safety would increase under any of the alternatives that those methods could be employed. The EA determined that the availability of alpha chloralose under the proposed action would not increase risks to human safety from the use of the method under the proposed action alternative (USDA 2010). Although risks do occur from the use of alpha chloralose, when used in consideration of human safety, the use of alpha chloralose does not pose additional risks to human safety beyond those associated with the use of other methods.

Issue 7 - Effects on the Regulated Harvest of Canada Geese

WS would have no impact on regulated goose hunting under Alternative 1. WS would not be involved with any aspect of goose damage management. The USFWS and the RIDEM could continue to regulate goose populations through adjustments in allowed take during the regulated harvest season and through depredation orders or permits to manage damage or threats of damage.

Similarly, WS would have no impact on regulated goose hunting under Alternative 2 since WS would not lethally remove geese under this alternative. However, resource/property owners may remove geese under depredation permits and depredation orders issued by the USFWS resulting in impacts similar to the proposed action and Alternative 1. The recommendation of non-lethal methods could disperse or exclude geese from areas under this alternative which could limit the ability of those interested to harvest geese in the damage management area. However, the goose population would be unaffected by WS under the technical assistance alternative (Alternative 2).

The magnitude of lethal goose take addressed in the proposed action would be low when compared to the goose mortality from all known sources. When WS' proposed take of geese was included as part of the known mortality of geese and compared to the estimated goose population, the impact on the goose population was below the level of removal required to lower population levels. The USFWS and the RIDEM will determine the number of geese taken annually by WS through the issuance of depredation permits.

Canada goose damage management activities conducted by WS will occur after consultation and approval by the USFWS and the RIDEM. With oversight by the USFWS and the RIDEM, the number of geese allowed to be taken by WS will not limit the ability of those interested to harvest geese during the regulated season. All take by WS will be reported to the USFWS annually to ensure take by WS is

incorporated into population management objectives established for goose populations. Based on the limited take proposed by WS and the oversight of by the USFWS and the RIDEM, WS' take of up to a total of 500 Canada geese annually, of which 150 could be taken during periods when geese present in the State could be considered migratory, will have no effect on the ability of those interested to harvest geese during the regulated harvest season.

XIV. CUMULATIVE IMPACTS OF THE PROPOSED ACTION

No significant cumulative environmental impacts are expected from any of the three alternatives, including the proposed action. Under the proposed action, the lethal removal of geese by WS would not have significant impacts on statewide goose populations when known sources of mortality are considered. No risk to public safety is expected when activities are provided and expected by requesting individuals in Alternative 2 and Alternative 3 since only trained and experienced personnel would conduct and/or recommend damage management activities. There is a slight increased risk to public safety when persons who reject assistance and recommendations and conduct their own activities, and when no assistance is provided under Alternative 1. However, under all of the alternatives, those risks would not be to the point that the impacts would be significant. The analysis in this EA indicates that an integrated approach to managing damage and threats caused by geese will not result in significant cumulative adverse impacts on the quality of the human environment.

XV. DECISION AND RATIONALE

Based on the analyses of the alternatives developed to address those issues in the EA, including individual and cumulative impacts of those alternatives, the following decision has been reached:

Decision

I have carefully reviewed the EA prepared for this proposal. I find the proposed action alternative to be environmentally acceptable, addressing the issues and needs while balancing the environmental concerns of management agencies, landowners, advocacy groups, and the public. The analyses in the EA adequately addresses the identified issues which reasonably confirm that no significant impact, individually or cumulatively, to wildlife populations or the quality of the human environment are likely to occur from the proposed action, nor does the proposed action constitute a major federal action. Therefore, the analysis in the EA does not warrant the completion of an EIS.

Based on the analyses in the EA, the issues identified are best addressed by selecting Alternative 3 (proposed action/no action) and applying the associated Standard Operating Procedures discussed in Chapter 3 of the EA. Alternative 3 successfully addresses (1) goose damage management using a combination of the most effective methods and does not adversely impact the environment, property, human health and safety, and/or non-target species, including T&E species; (2) it offers the greatest chance of maximizing effectiveness and benefits to resource owners and managers while minimizing cumulative impacts on the quality of the human environment that might result from the program's effect on target and non-target species populations; (3) it presents the greatest chance of maximizing net benefits while minimizing adverse impacts to public health and safety; and (4) it offers a balanced approach to the issues of humaneness and aesthetics when all facets of those issues are considered. Further analysis would be triggered if changes occur that broaden the scope of Canada goose damage management activities in the State, that affect the natural or human environment, or from the issuance of new environmental regulations. Therefore, it is my decision to implement the proposed action/no action alternative (Alternative 3) as described in the EA.

Finding of No Significant Impact

Based on the analyses provided in the EA, there are no indications that the proposed action (Alternative 3) will have a significant impact, individually or cumulatively, on the quality of the human environment. I agree with this conclusion and therefore, find that an EIS should not be prepared. This determination is based on the following factors:

1. Goose damage management as conducted by WS in the State is not regional or national in scope.
2. The proposed action would pose minimal risk to public health and safety. Risks to the public from many of the methods described in the EA were determined to be low in a formal risk assessment (USDA 1997).
3. There are no unique characteristics such as park lands, prime farm lands, wetlands, wild and scenic areas, or ecologically critical areas that would be significantly affected. WS' standard operating procedures and adherence to applicable laws and regulations will further ensure that WS' activities do not harm the environment.
4. The effects on the quality of the human environment are not highly controversial. Although there is some opposition to goose damage management, this action is not highly controversial in terms of size, nature, or effect.
5. Based on the analysis documented in the EA and the accompanying administrative file, the effects of the proposed damage management program on the human environment would not be significant. The effects of the proposed activities are not highly uncertain and do not involve unique or unknown risks.
6. The proposed action would not establish a precedent for any future action with significant effects.
7. No significant cumulative effects were identified through the assessment. The EA analyzed cumulative effects on target and non-target species populations and concluded that such impacts were not significant for this or other anticipated actions to be implemented or planned within the State of Rhode Island.
8. The proposed activities would not affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places, nor would they likely cause any loss or destruction of significant scientific, cultural, or historical resources.
9. WS has determined that the proposed program would not adversely affect any federally listed T&E species currently listed in the State that were addressed in the Biological Opinion issued by the USFWS on WS' programmatic activities (USDA 1997). In addition, WS has determined the proposed action alternative, using those methods identified in Appendix B of the EA, would have no effect on those T&E species currently listed in the State that were not addressed in the Biological Opinion issued by the USFWS.
10. The proposed action would be in compliance with all applicable Federal, State, and local laws.
11. No significant cumulative effects were identified by this assessment or other actions implemented or planned within the area.

Rationale

The rationale for this decision is based on several considerations. This decision takes into account public comments, social/political and economic concerns, public health and safety, and the best available science. The foremost considerations are that: 1) Canada goose damage management will only be conducted by WS at the request of landowners/managers, 2) management actions are consistent with applicable laws, regulations, policies and orders, and 3) no adverse impacts to the environment were identified in the analysis. As a part of this Decision, the WS program in Rhode Island will continue to provide effective and practical technical assistance and direct management techniques that reduce damage and threats of damage.



Charles S. Brown, Director-Eastern Region
USDA/APHIS/WS
Raleigh, North Carolina

Date

8/5/10

XVI. LITERATURE CITED

- Allan J.R., J.S. Kirby, and C.J. Feare. 1995. The biology of Canada geese *Branta canadensis* in relation to the management of feral populations. *Wildl. Bio.* 1:129-143.
- Atlantic Flyway Council. 1999. Atlantic Flyway resident Canada goose management plan. Canada Goose Committee, Atlantic Flyway Technical Section. 42 pp.
- Food and Drug Administration. 2003. Bird poisoning of federally protected birds. Office of Criminal Investigations. Enforcement Story 2003.
http://www.fda.gov/ora/about/enf_story/archive/2003/default.htm. Accessed on February 2, 2009.
- Klimstra, J.D., and P.I. Padding. 2009. Atlantic Flyway harvest and population survey data book. U.S. Fish and Wildlife Service, Laurel, MD.
- Raftovich, R.V., K.A. Wilkins, K.D. Richkus, S.S. Williams, and H.L. Spriggs. 2009. Migratory bird hunting activity and harvest during the 2007 and 2008 hunting seasons. U.S. Fish and Wildlife Service, Laurel, Maryland.
- USDA. 1997. Animal Damage Control Program: Final Environmental Impact Statement (revised). USDA/APHIS/WS-Operational Support Staff, 4700 River Road, Unit 87, Riverdale, Maryland 20737.
- USDA. 2010. Environmental Assessment: Reducing Canada goose damage throughout the State of Rhode Island. USDA/APHIS/WS, 463 West Street, Amherst, Massachusetts 01002.
- USFWS. 2001. Inside Region 3: Ohio man to pay more than \$11,000 for poisoning migratory birds. Volume 4(2):5.

- USFWS. 2005. Final Environmental Impact Statement: Resident Canada goose management. United States Fish and Wildlife Service, Division of Migratory Birds. Arlington, Virginia.
<http://www.fws.gov/migratorybirds/issues/cangeese/finaleis.htm>. Accessed November 24, 2009.
- White, D.H., L.E. Hayes, and P.B. Bush. 1989. Case histories of wild birds killed intentionally with famphur in Georgia and West Virginia. *Journal of Wildlife Diseases* 25:144-188.

APPENDIX A

RESPONSES TO COMMENTS ON THE ENVIRONMENTAL ASSESSMENT: REDUCING CANADA GOOSE DAMAGE THROUGHOUT THE STATE OF RHODE ISLAND

Comment 1 – Animals should not be killed for engaging in natural behaviors

As was discussed throughout the EA, WS' personnel use a thought process for evaluating and responding to requests for assistance which is depicted by the WS Decision Model (WS Directive 2.201) and described by Slate et al. (1992). WS' programmatic FEIS provides further discussion and examples of how the Decision Model is used to address damage and threats associated with wildlife (USDA 1997). WS' personnel assess the problem and then evaluate the appropriateness and availability (legal and administrative) of strategies and methods based on biological, economic, and social considerations. Following this evaluation, methods deemed to be practical for the situation are incorporated into a management strategy. After this strategy has been implemented, monitoring is conducted and evaluation continues to assess the effectiveness of the strategy. If the strategy is effective, the need for further management is ended.

Under WS Directive 2.101, preference is given to non-lethal methods when developing strategies to address requests for assistance with managing damage and threats associated with Canada geese when using the WS Decision Model. WS' personnel are frequently contacted after requesters have tried or considered non-lethal methods and found them to be impractical, too costly, or inadequate for effectively reducing damage. Since the objective is to alleviate or reduce damage and/or threats associated with Canada geese expeditiously (*i.e.*, in a timely manner) when requested, to prolong the time required to achieve the desired result through the use of methods that a cooperators has already tried or economically cannot afford to implement would not be prudent when damage caused by geese is economically burdensome to the requestor or when geese pose a threat to human safety.

The National Wildlife Research Center (NWRC) has been and continues to be a leading research facility in the pursuit and development of non-lethal methods to address wildlife damage and threats. Research conducted by the NWRC on avian repellents and nicarbazin has led to the registration of several products currently available to manage damage associated with geese. WS continues to be committed to using, pursuing, and developing non-lethal methods for resolving wildlife damage, including damage and threats associated with Canada geese. From FY 2005 through FY 2008, the WS program in Rhode Island employed non-lethal methods to harass and disperse 1,725 geese to alleviate damage or threats of damage.

Although non-lethal methods can be effective in alleviating damage or reducing threats of damage, the use of those methods in all situations are not always effective. Research indicates that most animals habituate to non-lethal methods, such as aversive sounds or visual deterrents, because of the lack of a negative stimulus that is realized after repeated use of the method. Non-lethal methods are employed to disperse wildlife away from areas where damage or threats of damage are occurring, which often relocates those wildlife species to other areas. If those species are dispersed to areas where damage or threats of damage no longer occur, the use of those methods has been successful. If the use of non-lethal methods disperses wildlife to areas where they cause damage or pose threats at that location, then the use of non-lethal methods alleviated damage or threats in one area but resulted in damage occurring in another area. Non-lethal methods can also cause a large group of wildlife to disperse into smaller groups which can result in damage occurring at multiple locations.

The difference in human values regarding what does and does not constitute an appropriate response to wildlife damage, including the humaneness of the response was addressed in the EA. The effectiveness

of methods available for use to manage damage or threats of damage associated with Canada geese was addressed under Issue 2 in Section 2.2 and Section 4.1 of the EA. In addition, the aesthetic value of geese was addressed in Issue 5 of the EA in Section 2.2 and Section 4.1. The humaneness and animal welfare concerns of methods available to manage damage or threats of damage were addressed under Issue 4 in Section 2.2 and Section 4.1 of the EA.

Comment 2 – WS’ programmatic EIS is out of date and the EA should not be tiered to the EIS

WS’ programmatic FEIS was developed to be reflective of WS’ wildlife damage management activities conducted at the time the FEIS was prepared (USDA 1997). As was stated in the EA under Section 1.5, information from WS’ programmatic FEIS was incorporated by reference into the EA. However, the EA is not tiered to the FEIS.

Comment 3 – Vagueness of damage assessment procedures and methods

WS uses a decision model based on a publication by Slate et al. (1992) which involves evaluating each request for assistance, taking action, and evaluating and monitoring results of the actions taken. The published article provides more detail on the processes used in the WS Decision Model. WS’ programmatic FEIS also provides more detail and examples of how the model is used (USDA 1997). WS’ personnel use the Decision Model to develop the most appropriate strategy to reduce damage and to reduce potential detrimental environmental effects from damage management actions based on individual requests for assistance.

In the EA, WS addresses damage that Canada geese cause and the methods that are currently available to reduce or prevent damage from occurring and to reduce threats to human safety. The need for action is discussed in Chapter 1 of the EA with the methods available for use discussed in Chapter 3 and in Appendix B of the EA. Examples of goose damage management projects are discussed in section 3.2 of the EA. WS’ Decision Model allows WS to adapt management activities to the species and damage occurring with consideration for human safety, non-targets, and potential environmental issues. WS describes damage associated with geese across four resource categories in the EA. Damage is further defined in the FEIS for the management of resident goose population (USFWS 2005) which the EA discusses in Section 1.5. Damage attributable to Canada geese is fairly recognizable and assessed based on the presence of geese at the damage site, type of damage occurring, and the availability of evidence linking geese to damage or the threat of damage. In the case of human safety from potential disease transmission, WS clearly states in section 1.2 of the EA the difficulties of linking disease transmission between geese and humans. However, the concern for human safety associated with goose feces in areas where humans frequent is valid based on the potential for transmission to occur. Therefore, linking geese to damage occurring is readily accomplished through standard assessment of the request for assistance and through site visits which are accomplished through WS’ Decision Model.

In section 3.1 of the EA, WS describes the alternatives in detail, including the methods, procedures, and recommendations that would be available for use to manage damage caused by geese in Rhode Island under those alternatives. The integrated approach to managing damage caused by wildlife is also discussed in section 3.1 of the EA, including a discussion of preventative and corrective damage management. Section 3.1 of the EA further describes the decision making process used by WS when addressing requests for assistance to manage damage caused by Canada geese. WS describes strategies employed through an integrated approach to addressing damage caused by geese, including technical assistance recommendations, direct operational assistance, educational efforts, and the research and development of effective damage management methods. WS further describes decision making based on community input under the proposed action alternative. Methods available for use to address goose

damage management under the alternatives are described in Chapter 3 and Chapter 4 with examples of goose damage management projects provided in section 3.2.

WS' Decision Model is the implementing mechanism for a damage management program that is adapted to an individual damage situation that allows for the broadest range of methods to be used to address damage or the threat of damage in the most effective, most efficient, and mostly environmentally conscious way available. When a request for assistance is received to resolve or prevent damage caused by geese, WS conducts site visits to assess damage or threats, identifies the cause of the damage, and applies the decision model described by Slate et al. (1992) and in WS' programmatic FEIS (USDA 1997) to apply methods to resolve or prevent damage using those methods available. The process for providing assistance is clearly defined by WS' Decision Model under the proposed action in the EA.

WS addresses specific damage management recommendations in the EA through the alternatives. The proposed action alternative describes an integrated damage management program. An integrated approach to resolving requests for assistance was specifically discussed in the EA which describes how all available methods could be applied, individually or in combination, to resolve requests for assistance based on assessing damage through WS' Decision Model. The application of the decision model as part of recommending damage methods was also discussed in Chapter 3 of the EA.

Specific damage management recommendations would not add to the analysis in the EA since WS' addresses methods in the EA individually and collectively to determine potential impacts. To comply with CEQ regulations, agencies are encouraged to incorporate material by reference in order to reduce the volume of NEPA documents (40 CFR 1502.21). Information from WS' programmatic FEIS was incorporated by reference into the EA to comply with CEQ regulations to reduce bulk and excessive paperwork (Eccleston 1995). The description and application of methods is discussed in detail in WS' programmatic FEIS (USDA 1997) which has been referenced in the EA.

Since individual wildlife damage management actions can be categorically excluded from further analysis according to APHIS regulation for implementing the NEPA, the purpose of the EA as described in section 1.1 of the EA is to 1) facilitate planning, interagency coordination and the streamlining of program management; 2) clearly communicate to the public the analysis of individual and cumulative impacts of program activities; and 3) evaluate and determine if there are any potentially significant or cumulative adverse effects from the proposed program. The EA was prepared to consider potential individual and cumulative effects associated with managing geese in Rhode Island using all available methods. The EA evaluates the use of all methods individually and cumulatively which allows for a more comprehensive and less redundant analysis compared to comparing methods applied to specific damage requests.

Comment 4 - Broad Scope of the EA

The scope of the EA is discussed in section 1.3 and section 2.1 of the EA. WS has the discretion to determine the geographic scope of their NEPA analyses (*Kleppe v Sierra Club*, 427 U.S. 390, 414 (1976), CEQ 1508.25) and WS has determined that the scope of this EA is appropriate (see Section 2.3 in the EA). Ordinarily, according to APHIS procedures implementing the National Environmental Policy Act (NEPA), individual wildlife damage management actions may be categorically excluded (7 CFR 372.5(c), 60 FR 6000-6003). The intent of preparing the EA was to determine if the proposed action would potentially have significant cumulative impacts on the environment that would warrant the preparation of an Environmental Impact Statement or a finding of no significant impact. The EA addresses impacts for the entire State to analyze cumulative impacts to provide a better analysis than multiple EAs covering smaller zones.

Comment 5 – WS should produce regional EAs

The commenter does not specifically mention whether WS should produce regional EAs that encompass like areas within the State of Rhode Island or whether WS should produce regional EAs that encompass broader geographical areas outside of the State of Rhode Island (*e.g.*, an EA that covers multiple states). However, WS has the discretion to determine the scope of the analyses conducted in an EA. WS receives requests for assistance to manage damage and threats of damage associated with geese on a small portion of the land areas of Rhode Island. Although the EA evaluates activities that could be conducted in areas where damage management activities are requested in the future, the EA emphasizes major issues as those issues relate to specific areas whenever possible. Many of the major issues discussed in the EA apply wherever goose damage and the subsequent damage management activities occur.

Comment 6 – WS should proceed with preparing an EIS for goose damage management activities

The purpose of preparing an EA for the proposed activities was discussed in Section 1.1 of the EA. The issue of preparing an EA for an area the size of Rhode Island was considered during the development of the EA but was not analyzed in detail for reasons provided in Section 2.3 of the EA. The intent of preparing the EA was to determine if the proposed action would potentially have significant cumulative impacts on the environment that would warrant the preparation of an Environmental Impact Statement or a finding of no significant impact. The EA addresses impacts for the entire State to analyze cumulative impacts to provide a better analysis than multiple EAs covering smaller zones. Therefore, if significant impacts are identified in the EA or if potential significant impacts are identified, the EA would form the basis for the preparation of an environmental impact statement.

Comment 7 – Incentives or disincentives of different management approaches should be spelled out

As stated in the EA, WS only provides assistance after a request has been received and a Memorandum of Understanding, a cooperative service agreement, or other comparable document has been signed by WS and the requesting entity in which all methods that could be used to address geese causing damage are agreed upon. The effectiveness of methods, including non-lethal and lethal methods available to manage damage caused by geese in Rhode Island, was an issue identified during the development of the EA and was evaluated in detail in Chapter 2 and in relationship to each of the alternatives in Chapter 4. As stated in Chapter 4 of the EA, methods employed to manage goose damage, whether non-lethal or lethal, are often temporary with the duration dependent on many factors discussed in the EA. WS' employs only those methods as agreed upon by the requestor after available methods are discussed.

The commenter states that since geese return to an area after the use of lethal methods, the use of lethal methods creates a financial incentive to continue the use of only lethal methods. The comment incorrectly assumes that geese only return to an area where damage was occurring if lethal methods. However, as stated throughout the EA, the use of non-lethal methods are also often temporary which could result in geese returning to an area where damage was occurring once those methods are no longer used. The comment correctly states that geese will return if suitable habitat continues to exist at the location where damage was occurring and goose densities are sufficient to occupy all available habitats. Therefore, any reduction or prevention of damage from the use of methods addressed in the EA will be temporary if habitat conditions continue to exist. As addressed in the EA, WS' primarily receives requests to reduce or prevent damage caused by resident Canada geese in Rhode Island. Therefore, any method that disperses or removes geese from areas will only be temporary if habitat continues to exist the following year when geese return to nest. Dispersing geese using pyrotechnics, repellents, border collies, or any other non-lethal method addressed in the EA often requires repeated application to discourage geese which increases costs, moves geese to other areas where they could cause damage, and are temporary if habitat condition remain unchanged. Dispersing and the translocating of geese could be

viewed as moving problem geese from one area to another which would require addressing damage caused by those geese at another location. WS' recommendation of or use of techniques to modifying existing habitat or making areas unattractive to geese was addressed in the EA in section 3.1 and in Appendix B of the EA. Therefore, WS' objective is to respond to request for assistance with the most effective methods and to provide for the long-term solution to the problem using WS' Decision Model to adapt methods in an integrated approach to managing goose damage that is agreed upon by the cooperator.

Comment 8 – Evidence for the effectiveness of proposed actions is lacking

The effectiveness of methods available to resolve damage or threats of damage was identified as an issue analyzed in detail in the EA. Managing damage caused by geese can be divided into short-term redistribution approaches and long-term population and habitat management approaches (Cooper and Keefe 1997). Short-term approaches focus on redistribution and dispersal of geese to limit use of an area where damage or threats were occurring. Short-term redistribution approaches may include prohibiting feeding, hazing with vehicles, dogs, and adverse noise, erecting access barriers such as wire grids or fences, and taste aversion chemicals (Cooper and Keefe 1997). Population reduction by limiting survival or reproduction, removing geese, and habitat modification are considered long-term solutions to managing damage caused by geese (Cooper and Keefe 1997). The issue of method effectiveness, in terms of how well those methods alleviate damage or threats of damage, was analyzed in detail as the issue relates to the methods available under each of the alternatives in Chapter 4 of the EA.

Also related to the effectiveness of methods, which was also alluded to by the commenter, is the cost effectiveness of methods. The cost effectiveness of methods available to resolve or prevent damage was identified as an issue in the EA, but was not analyzed in detail (see Section 2.3 of the EA). An analysis of cost-effectiveness in many bird damage management situations is difficult or impossible to determine because the value of benefits may not be readily calculable and personal perspectives differ about damage. For example, the potential benefit of eliminating geese from defecating on public beaches could reduce incidences of illness among an unknown number of users. Since some bird-borne diseases are potentially fatal, or severely debilitating, the value of the benefit may be high. However, no studies of disease problems with and without bird damage management have been conducted, and, therefore, the number of cases prevented because of goose damage management are not possible to estimate. Also, it is rarely possible to conclusively prove that geese are responsible for individual disease cases or outbreaks which were discussed in the EA.

Under the proposed action, WS has the ability to adapt methods to damage situations to effectively reduce or prevent damage from occurring. Under the proposed integrated approach, all methods, individually or in combination, could be employed as deemed appropriate through WS' Decision Model to address requests for assistance. WS' objective when receiving a request for assistance under the proposed action is to reduce damage and threats to human safety or to prevent damage from occurring using an integrated approach to managing goose damage. Therefore, under the proposed action, WS would employ methods adaptively to achieve that objective.

CEQ does not require a formal, monetized cost-benefit analysis to comply with the NEPA (40 CFR 1508.14) and consideration of this issue is not essential to making a reasoned choice among the alternatives being considered. Appendix L of WS' programmatic FEIS (USDA 1997) states:

“Cost effectiveness is not, nor should it be, the primary goal of the APHIS WS program. Additional constraints, such as the environmental protection, land management goals, and others, are considered whenever a request for assistance is received. These constraints increase the cost of the program while not necessarily increasing its effectiveness, yet they are a vital part of the APHIS WS Program.”

WS is aware of concerns that federal bird damage management should not be allowed until economic losses become unacceptable. However, this type of policy would be inappropriate to apply to public health and safety situations. In addition, even though some losses can be expected and tolerated by agriculture producers and property owners, WS has the legal responsibility and direction to respond to requests for goose damage management, and it is WS' policy to aid each requester to minimize economic losses and threats. Furthermore, in a ruling for Southern Utah Wilderness Alliance, et al. vs. Hugh Thompson, Forest Supervisor for the Dixie NF, et al., the court denied plaintiffs' motion for preliminary injunction. In part the court found that it was only necessary to show that damage from wildlife is threatened, to establish a need for wildlife damage management (U.S. District Court of Utah 1993).

Comment 9 - Field Use of Most Up-to-date Methods

WS uses trained, professional employees to conduct goose damage management programs in Rhode Island and continues to train employees on newly developed and available techniques. The National Wildlife Research Center (NWRC) functions as the research arm of WS by providing scientific information and development of methods for wildlife damage management that are effective and environmentally responsible. NWRC scientists work closely with WS' state programs, wildlife managers, researchers, and others to develop and evaluate wildlife damage management techniques.

The analysis in the EA is based on the best information and methods available, or that are being developed but not yet available. WS' proposed action in the EA would allow methods to be used in an integrated approach through the use of WS' Decision Model. The Decision Model allows WS to develop management strategies that alleviate damage in the most cost effective manner possible while minimizing the potentially harmful risks to humans, pets, non-target species, and the environment. Chapter 2 and Appendix B of the EA discuss products that are currently available as well as products that may be considered should they become available at a future time. In addition, most of the methods currently available were described and their use patterns discussed in WS' programmatic FEIS (USDA 1997).

The comment specifically references ncarbazin which was addressed in the EA. As stated in the EA, ncarbazin is an EPA registered reproductive inhibitor registered to reduce egg production and viability in Canada geese at site specific locations in urban areas. WS also states in the EA that ncarbazin is not currently registered for use in Rhode Island. If ncarbazin becomes available for use in Rhode Island, WS could recommend the use of products containing ncarbazin labeled for use to manage localized goose populations or could directly employ products containing ncarbazin under the proposed action. If registered, products containing ncarbazin would be available to entities other than WS, if those entities possess the appropriate pesticide applicators license. Therefore, products containing ncarbazin could be used under any of the alternatives discussed if they become available for use.

Comment 10 – WS should work to register OvoControl® G for geese in the State

An avian reproductive inhibitor containing the active ingredient ncarbazin is currently registered with the Environmental Protection Agency (EPA) under the tradename OvoControl® G (Innolytics, LLC, Rancho Santa Fe, CA) for use to manage local Canada goose populations. Ncarbazin, when consumed and absorbed into the bloodstreams in sufficient amount, reduces the hatchability of eggs produced by avian species. Ncarbazin, as a method to reduce damage and threats of damage, was specifically addressed in the EA and could be available to WS and to other entities, with the appropriate applicators license, under any of the alternatives identified in the EA. However, as stated in the EA, ncarbazin under the tradename OvoControl® G was not registered for use in the State during the development of the EA.

OvoControl® G was registered for use in Rhode Island and many other states when first developed but the registration in Rhode Island and other states was allowed to expire by the manufacturer. The registration of OvoControl® G in the State would have to be initiated by the manufacturer.

Comment 11 – The egg hatchability effects of nicarbazin in Canada geese is not variable

The comment refers to the use of the term “*variability*” and “*variable*” in regards to the egg hatchability effect of nicarbazin in avian species (see page 53 and page 59 in the EA). The use of those terms occurred in reference to the difficulties in calculating an actual reduction in a targeted bird population prior to the application of the treated bait since those studies available indicated that some birds continued to produce viable eggs after consuming treated bait. The comment makes reference to a publication by Avery et al. (2008) and an unpublished manuscript by Reinoso et al. (2010) as providing an indication that the effects of nicarbazin on egg hatchability are “*predictable and consistent*”.

The publication by Avery et al. (2008) examined the efficacy of nicarbazin to reduce the viability of eggs laid by pigeons and information available in that publication was cited in the EA during discussions regarding nicarbazin. The manuscript by Reinoso et al. (2010) was provided by the commenter but was unpublished during the development of the EA and during the development of responses to comments.

The use of the terms “*variability*” and “*variable*” arose during the evaluation of available publications at the time the EA was developed and was based on the information in those studies that indicated birds provided treated bait in controlled, laboratory studies continued to produce viable eggs despite those birds being provided no other food besides treated bait. Since birds provided treated bait yet continued to lay viable eggs (although at a reduced rate) adds a level of uncertainty into determining the rate a population reduction could occur from the use of nicarbazin. Numerous studies on nicarbazin have shown that when sufficient levels (which appears to vary by bird species) of the components in nicarbazin are absorbed into the bloodstreams of birds, the hatchability of eggs is reduced.

In the study conducted by Avery et al. (2008), bait treated with nicarbazin, at the current formulation on the label for pigeons of 5,000 parts per million (ppm), was provided to 11 pairs of pigeons in cage studies for four hours each morning (0800 to 1200 hours) when birds are presumable more likely to feed. During the four hour period in the morning, no other food sources were available to the pigeons with untreated maintenance food provided after the four hour period. The routine of providing treated bait during the four hour morning period continued until a clutch of eggs was laid or until 28 days elapsed (Avery et al. 2008). The authors indicated the four hour feeding period where pigeons were provided only treated bait provided sufficient opportunity for the birds to consume enough treated bait to increase blood levels of the nicarbazin components (Avery et al. 2008). During the pre-treatment phase of the project, the 11 pairs of pigeons produced 22 healthy chicks. During the treatment phase, 9 chicks (1 chick hatched but died shortly after) hatched which represented a reduction in the number of chicks produced by 59% compared to the phase when birds were allowed to feed on untreated bait only (Avery et al. 2008). Despite being provided sufficient bait treated with nicarbazin, those pigeons continued to produce viable eggs (although at a reduced rate). In addition, the study conducted by Avery et al. (2008) was not replicated beyond the initial investigation.

When evaluating the potential impacts from the use of nicarbazin on local populations of target bird species, the evaluation should include the estimated rate of decline in the population. Since the available studies on the effects of nicarbazin on the hatchability of eggs indicate variability exists since not all eggs laid are unviable, the potential impacts on a species population are also likely to be variable. If Avery et al. (2008) had replicated the results and each replicate indicated the hatchability of eggs was reduced 59% each time eggs were laid, estimating a potential decline in a local population could be achieved. Based on the Avery et al. (2008) study, it is unknown whether pigeons allowed to continue to feed on treated bait

would have continued to show a 59% reduction in eggs laid being unviable. In addition, it is unknown if pigeons would have reached zero viable eggs laid if allowed to continue to feed on treated bait or the amount of time required for those pigeons that produced viable eggs in the study to reach blood levels of nicarbazine components to reduce the viability of those eggs laid to zero.

As was mentioned previously, the commenter provided an unpublished manuscript by Reinoso et al. (2010) which evaluated the use of nicarbazine to reduce the fertility of white pekin duck eggs. Based on the information in the manuscript, the pekin ducks used in the experiment were provided only nicarbazine treated food during a two week treatment period which differs from the Avery et al. (2008) study which only provided treated food during a four hour period. According to the manuscript, the authors found that the fertility of eggs in white pekin ducks could be reduced to zero at certain dosage levels of nicarbazine (Reinoso et al. 2010). This study provides some indication that white pekin ducks provided only food treated with appropriate levels of nicarbazine can reduce the fertility of eggs to zero which appears to be “predictable and consistent” as stated by the commenter.

To reduce the hatchability of eggs, target avian species must consume a sufficient dose daily for the entire duration of the breeding season. The nicarbazine label for geese requires the applicator to condition geese to feed at a particular location and at the same time daily during an acclimation period. Acclimation is achieved when geese return to the same location and at the same time daily to feed on bait. The label also requires the applicator to remove any uneaten bait. Under field conditions, ensuring geese consume a sufficient dose of nicarbazine is difficult and unlike the cage studies, geese cannot be forced to consume treated bait daily nor is nicarbazine treated bait the only food source available to free-ranging geese. Therefore, variability is likely to exist when attempting to determine the rate of population decline that might occur from the use of nicarbazine to manage local geese populations.

Comment 12 – Coccidiosis is not considered a fungal disease

The comment refers to the use of the term fungal disease in the EA in reference to coccidiosis (see page 58 of the EA). The statement in the EA read “Nicarbazine was first developed to treat coccidiosis outbreaks in broiler chickens and has been approved as a veterinary drug by the FDA since 1955 for use in chicken feed to prevent the **fungal** disease coccidiosis” [emphasis add]. As the comment correctly identifies, coccidiosis is a disease caused by pathogenic protozoa and is not a fungal disease. The sentence in the EA has been corrected to read “Nicarbazine was first developed to treat coccidiosis outbreaks in broiler chickens and has been approved as a veterinary drug by the FDA since 1955 for use in chicken feed to prevent the **protozoal** disease coccidiosis” [emphasis added].

Comment 13 – The Ovocontrol® G label no longer includes the definition of an urban area

The Ovocontrol® G label restricts the use of the product to “...urban areas, such as office parks, recreational parks, airports, golf courses, schools, hospitals, restaurants, and commercial/industrial sites”. The registration fact sheet for nicarbazine, particularly Ovocontrol® G, specifically states that “[u]rban is defined as a municipality and its adjacent areas with a population of 50,000 or more” (EPA 2005). As the comment correctly states, the current label for Ovocontrol® G no longer contains explanatory language defining urban areas. The use of the definition of “urban” in the EA originated from the registration fact sheet for nicarbazine (EPA 2005) and not the original product label for Ovocontrol® G which included the definition of “urban”.

A search of available information from the EPA currently does not include a definition of “urban” in terms of the use of nicarbazine. As stated previously, the reference to a definition of “urban” in relationship to the use of nicarbazine occurs in the registration fact sheet for nicarbazine (EPA 2005). Although the current label does not include a definition of the term “urban”, there appears to be no

indication that the definition of the term has changed as previously defined in the fact sheet for nicarbazin (EPA 2005).

Comment 14 - Missing non-lethal before lethal alternative

The comment indicated that WS should have evaluated an alternative whereby “*all*” non-lethal methods available would be employed prior to the use of lethal methods. However, the comment continues by stating that not “*all*” non-lethal methods would have to be employed under the alternative before lethal methods are employed. An alternative that would employ all non-lethal methods before lethal methods was considered in the EA but was not analyzed in detail in section 3.3 of the EA. WS’ proposed alternative as outlined in the EA is similar to a non-lethal before lethal alternative because WS encourages and considers the use of non-lethal methods before lethal methods (WS Directive 2.101). Adding a non-lethal before lethal alternative and the associated analysis would not add additional information to the analysis for the public or decision maker. WS recognizes that the most effective approach to resolving wildlife damage is to use an integrated approach which uses several damage management methods (non-lethal and/or lethal) simultaneously or sequentially. If the requester is already using non-lethal methods or if the birds have habituated to scare tactics, repellents, or other non-lethal dispersal techniques, WS would not consider continuing to implement those techniques because they have not proven effective in those situations. When evaluating methods for a damage situation, WS recognizes that some methods may be more or less effective, or applicable.

Comment 15 – WS’ need for a depredation permit to treat eggs and/or nests of Canada geese

The comment states that under the nest and egg depredation order for Canada geese (50 CFR 21.50), WS does not need a depredation permit from the USFWS as was stated in the EA. However, the language under 50 CFR 21.50(b) of the nest and egg depredation order states the order “...*authorizes private landowners and managers of public lands (landowners); homeowners’ associations; and village, town, municipality, and county governments (local governments); and the employees or agents of any of these persons or entities to destroy resident Canada goose nests and eggs on property under their jurisdiction when necessary to resolve or prevent injury to people, property, agricultural crops, or other interests.*” Under 50 CFR 21.50(c) the order states “*Only landowners, homeowners’ associations, and local governments (and their employees or their agents) in the lower 48 States and the District of Columbia are eligible to implement the resident Canada goose nest and egg depredation order.*” Since WS does not fall within the category of authorized entities to conduct egg and destruction without a permit from the USFWS, WS routinely requests depredation permits from the USFWS that allows nest and egg destruction activities for Canada geese.

Comment 16 – Humaneness of Methods

The EA identifies humaneness of available methods as a major issue in the EA (see Section 2.2) and is addressed in relationship to the alternatives in Chapter 4 of the EA. The humaneness of methods and actions was specifically addressed in section 4.1 of the EA. WS continues to evaluate existing and new methods for animal welfare and humaneness concerns. WS’ mission is to reduce damage, not goose populations and provides funding annually to develop and bring to the field newly developed and more species specific and humane methods. As stated in the EA, people may perceive the humaneness of a method or an action differently and certain methods generally deemed as humane can be inhumane if used inappropriately. WS’ goal is to use methods as humanely as possible to effectively resolve requests for assistance to reduce damage and human safety.

While it is regrettable that wild animals die to alleviate damage in some situations, WS believes that if an animal death must occur, then it should occur with a minimum amount of distress and pain, in as short a

period of time as practical, and with compassion. WS is trying to achieve a “balance” between the needs of people, recognizing that people are part of the environment, and animals while keeping issues like protection of the environment, economics, and humaneness in perspective. WS recognizes that animal welfare organizations are concerned that some methods used to manage wildlife damage may expose animals to pain and suffering. WS believes that humaneness of an action or management plan must not only consider the effects of the action on the wildlife but also on the people or other species that may be or are affected by wildlife. Ideally, such protection would be achieved through non-lethal means, but when non-lethal means are not practical or effective, lethal means may be the only way to accomplish such damage management.

Comment 17 – Lethal control methods are ineffective in the long term

The effectiveness in goose damage management methods was identified as an issue that was fully evaluated in the EA which addressed the effectiveness of lethal and non-lethal methods (see Issue 2 in Section 2.2 of the EA). As was described in the EA, when WS receives a request for assistance, the objective is to alleviate damage or reduce threats of damage. Most often, the damage or threat of damage has reached a level where people seek assistance. Therefore, methods to resolve damage or the threat of damage must be employed in such a manner as to ensure timely resolution, in consideration of potential harmful effects on humans, target and non-target wildlife, and the environment. WS’ personnel use a decision model to determine the appropriate methods when all those aspects are considered.

A common issue raised is that the use of lethal methods is ineffective because additional geese are likely to return to the area, either after removal occurs or the following year when birds return to the area to nest. This assumes geese only return to an area where damage was occurring if lethal methods are used. However, the use of non-lethal methods is also often temporary which could result in geese returning to an area where damage was occurring once those methods are no longer used. The common factor when employing any method is that geese will return if suitable habitat continues to exist at the location where damage was occurring and goose densities are sufficient to occupy all available habitats. Therefore, any reduction or prevention of damage from the use of methods addressed in Appendix B of EA, either lethal or non-lethal will be temporary if habitat conditions continue to exist. Therefore, any method that disperses or removes geese from areas will only be temporary if habitat continues to exist the following year when geese return to nest.

Dispersing geese using pyrotechnics, repellents, border collies, or any other non-lethal method addressed in Appendix B of the EA often requires repeated application to discourage geese which increases costs, moves geese to other areas where they could cause damage, and are temporary if habitat conditions remain unchanged. Dispersing and the translocating of geese could be viewed as moving a problem from one area to another which would require addressing damage caused by those geese at another location. WS’ recommendation of or use of techniques to modifying existing habitat or making areas unattractive to geese is discussed in Appendix B of the EA. WS’ objective is to respond to request for assistance with the most effective methods and to provide for the long-term solution to the problem using WS’ Decision Model to adapt methods in an integrated approach to managing goose damage that is agreed upon by the cooperator.

Managing damage caused by geese can be divided into short-term redistribution approaches and long-term population and habitat management approaches (Cooper and Keefe 1997). Short-term approaches focus on redistribution and dispersal of geese to limit use of an area where damage or threats were occurring. Short-term redistribution approaches may include prohibiting feeding, hazing with vehicles, dogs, and adverse noise, erecting access barriers such as wire grids or fences, and taste aversion chemicals (Cooper and Keefe 1997). Population reduction by limiting survival or reproduction, removing

geese, and habitat modification are considered long-term solutions to managing damage caused by geese (Cooper and Keefe 1997).

Redistribution methods are often employed to provide immediate resolution to damage occurring until long-term approaches can be implemented or have had time to reach the desired result. The USFWS has evaluated and implemented long-term approaches to managing resident Canada goose populations with the intent of reducing damage associated with resident Canada geese (USFWS 2005). Scaring geese and physical barriers are often short-term solutions that move geese to other areas where damages or threats could occur (Smith et al. 1999). Some short-term methods may become less effective in resolving damage as the goose population increases and become more acclimated to human activity (Smith et al. 1999). Long-term solutions to resolving damage would require management of the population (Smith et al. 1999). Cooper and Keefe (1997) found that fencing and harassment with dogs are the only effective short-term approaches to reducing goose damage but likely redistribute the problem elsewhere. Hunting, goose removal, and egg destruction were identified as long-term solutions to resolving goose damage over larger geographical areas by reducing goose populations (Cooper and Keefe 1997). An integrated approach to resolving goose damage is likely the most effective (Smith et al. 1999).

Comment 18 – Ensure local concerns are considered before activities are conducted

The comment specifically addresses WS' discussion of the community based decision making process that was addressed in section 3.1 of the EA under the proposed action alternative. In particular, the comment questions how the decision making process will ensure that local concerns about damage management activities will be considered before actions are taken.

Under a community based decision making process, WS would provide information, demonstration, and discussion on all available methods to the appropriate representatives of the community for which services were requested to ensure a community based decision is made. By involving decision makers in the process, damage management actions can be presented to allow for decisions on damage management to involve those individuals that the decision maker(s) represents. As addressed in the EA, WS would provide technical assistance to the appropriate decision maker(s) to allow for information on damage management activities to be presented to those represented by the decision maker(s), including demonstrations and presentation by WS at public meetings to allow for involvement of the community. Requests for assistance to manage geese often originate from the decision maker(s) based on community feedback or from concerns about damage or threats to human safety. As representatives, the decision maker(s) are able to provide the information to local interests either through technical assistance provided by WS or through demonstrations and presentation by WS on goose damage management activities. This process allows decisions on goose damage management activities to be made based on local input.

In the case of private property owners, the decision maker is the individual that owns or manages the affected property. Private property decision makers were also discussed in the EA under section 3.1. The decision maker has the discretion to involve others as to what occurs or does not occur on property they own or manage. Due to privacy issues, WS can not disclose cooperator information to others. Therefore, in the case of an individual property owner or manager, the involvement of others and to what degree others are involved in the decision making process is a decision made by that individual property owner or manager.

Comment 19 – The term “damage” is inherently prejudicial

The use of the term “*damage*” is discussed in Section 1.2 under the need for action in the EA. The alleviation of damage or other problems caused by or related to the behavior of wildlife is termed wildlife damage management and is recognized as an integral component of wildlife management (The Wildlife

Society 1992). The imminent threat of damage or loss of resources is often sufficient for individual actions to be initiated and the need for damage management is derived from the specific threats to resources. Those species have no intent to do harm. They utilize habitats (*e.g.*, reproduce, walk, forage, deposit feces) where they can find a niche. If their activities result in lost economic value of resources or threaten human safety, people characterize this as damage. When damage exceeds or threatens to exceed an economic threshold and/or poses a threat to human safety, people seek assistance with resolving damage or reducing threats to human safety. The threshold triggering a request for assistance is often unique to the individual person requesting assistance and can be based on many factors (*e.g.*, economic, social, aesthetics). Therefore, “*damage*” is often unique to the individual person and damage occurring to one individual may not be considered damage by another individual. However, the use of the term “*damage*” is consistently used to describe situations where a situation has arisen to a point where the individual person requesting assistance has determined the losses associated with wildlife is actual damage, which is generally associated with economic losses to resources as described in the EA.

Comment 20 – No biological “overpopulation” problem but rather a human perception problem

The EA addresses human perception as the concept relates to managing damage associated with geese in Section 1.2 of the EA. Both sociological and biological carrying capacities must be applied to resolve wildlife damage problems. The wildlife acceptance capacity, or cultural carrying capacity, is the limit of human tolerance for wildlife or the maximum number of a given species that can coexist compatibly with local human populations. Biological carrying capacity is the land or habitat’s ability to support healthy populations of wildlife without degradation to the species’ health or their environment during an extended period of time (Decker and Purdy 1988). Those phenomena are especially important because they define the sensitivity of a community to a wildlife species. For any given damage situation, there are varying thresholds of tolerance exhibited by those directly and indirectly affected by the species and any associated damage. This damage threshold determines the wildlife acceptance capacity. While the habitat may have a biological carrying capacity to support higher populations of wildlife, in many cases the wildlife acceptance capacity is lower or has been met. Once the wildlife acceptance capacity is met or exceeded, people begin to implement population or damage management, including lethal methods, to alleviate damage or address threats to human health and safety.

Comment 21 – Moving geese around has exacerbated the problem of geese in urban areas

Geese were nearly extirpated from their natural breeding ranges in much of the United States from overutilization in the early 1900s. However, efforts by many federal, state, and local agencies and individuals across the United States has restored and even expanded the breeding range of Canada geese in the United States through the translocation of geese as part of restoration efforts. The comment claims the practice of translocating geese as part of restorations efforts in the early- to mid-1900s has increased the number of geese in urban/suburban areas where geese were previously not known to occur or were only present during the migration periods.

Most translocation attempts to restore geese in the United States targeted areas where suitable habitat existed (*e.g.*, at wildlife management areas or National Wildlife Refuges) and did not include translocating geese to highly urban areas. Today, the translocation of geese for restoration purposes no longer occurs in Rhode Island.

Comment 22 – Defining geese as resident or migratory is flawed

The definition of “*resident*” geese and “*migratory*” geese was discussed in Section 2.2 of the EA. WS’ definition of resident and migratory geese follows the use of those terms as they relate to the behavior of Canada geese in accordance with 50 CFR 21.3 (USFWS 2005). As stated in the resident Canada goose

FEIS, “Canada geese are highly philopatric (propensity to return to) to natal areas and no evidence presently exists documenting breeding between Canada geese nesting in the conterminous United States and those subspecies nesting in Northern Canada and Alaska” (USFWS 2005). Therefore, the use of the term “resident” is used to denote those geese breeding in the conterminous United States while the term “migratory” is used to denote those geese that breed in Northern Canada and Alaska. Under field conditions, distinguishing geese between population segments can be difficult. Determining whether a Canada goose present in the State is migratory or a resident (present in the State year round) can also be difficult under field conditions. Therefore, using the terms “resident” and “migratory” assists with identifying which population segments are being addressed and allows for a more complete analyses of potential impacts associated with damage management activities by evaluating activities as those activities relate to each Canada goose population segment.

Comment 23 – Migratory goose populations from Canada are below “desired” population levels

The EA addresses Canada goose damage management activities in the State of Rhode Island under the alternatives analyzed in detail. Those damage management activities conducted under the alternatives could involve geese that are present in the State during those periods when migratory geese could be present in the State. The potential for the alternatives to adversely affect migratory populations of Canada geese was addressed in Chapter 4 in the EA.

As was discussed in the EA, most requests for assistance and thus, most damage management activities would be conducted during those periods of time when geese present in the State are considered resident geese. However, as the EA states, damage management activities could be conducted during those periods when migrant geese from Canada could be present. As was shown in the EA, the magnitude of activities conducted under any of the alternatives that could be conducted during those periods of time when migratory geese may be present in the State would be low when compared to the annual take of migratory populations during the hunting seasons. All lethal take of geese would occur pursuant to depredation permits issued by the USFWS for the take of geese. Therefore, the lethal take of geese by WS would only occur when and at levels permitted by the USFWS. The USFWS has management authority of migratory bird populations in the United States and therefore, responsible for setting and determining population objectives for those species’ populations. Since take by WS only occurs when permitted by the USFWS, WS’ take occurs within the scope of objectives for those populations.

Comment 24 – Wildlife management decisions are derived from political imperatives

The comment infers that wildlife management actions are only taken to “stop the phone from ringing” and “management serves to provide politicians with the ability to assure constituents that something is being done”. However, requests for assistance received by WS most often originate from those persons experiencing economic losses or threats associated with Canada geese and do not originate from political entities. As was discussed in Chapter 1 of the EA under the need for action, Canada geese can cause economical losses to a variety of resources that result in lost revenue and income from people. In addition, geese can pose threats to human safety as well as create situations that are aesthetically displeasing to people.

As was state previously and throughout the EA, an economically unsustainable situation posed by geese for one individual may be tolerable for another individual. Similar, the presence of goose feces on sidewalks or lawns could be acceptable for some people but could also be unacceptable for other people. Therefore, the need for management actions as those actions relate to wildlife damage management are determine, in part, by those persons experiencing damage or a threat of damage. Under the proposed action alternative, WS could provide technical assistance only, provide direct operational assistance only, or provide technical and operational assistance. The primary statutory authority for the WS program is

the Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C. 426-426b) as amended, and the Act of December 22, 1987 (101 Stat. 1329-331, 7 U.S.C. 426c). The WS program is the lead federal authority in managing damage to agricultural resources, natural resources, property, and threats to human safety associated with wildlife. WS' directives define program objectives and guide WS' activities to manage wildlife damage. Therefore, it is WS' policy to provide assistance when requested and when funding is available.

Comment 25 – Turf grass has profoundly increased the carrying capacity for Canada geese

The comment states that turf grass “...has resulted in profound increase[s] in carry capacity for Canada geese in regions where they were previously absent, winterers, or passing migrants”. As the comment states, several methods are available to discourage geese from feeding on turf grass. Methods available to discourage foraging on turf grass, including types of grass that are less palatable to geese, were discussed in Appendix B of the EA.

WS has the ability to assist those persons experiencing damage or threats of damage associated with geese that request assistance from WS; however, WS does not have the statutory authority to enforce large scale changes in the types of turf grass planted to lower the carrying capacity across broad areas. When a request for assistance is received by WS, recommendations and/or direct assistance can be provided to that person or those persons requesting assistance, which could include recommendations or assistance with altering the type(s) of turf grass planted in an area or areas in which that person or those persons own or manage. The EA also discussed educational efforts by WS through technical assistance in which information of types of turf grass unpalatable to geese could be discussed and presented; however, WS does not have the authority to require entities implement recommendations made.

Comment 26 – Habitat modifications should be employed to discourage the presence of geese

The EA states that habitat modifications are considered long-term solutions to managing damage caused by geese with other methods employed to initially resolve damage or threats of damage until other long-term solutions can be implement. If habitat continues to exist in areas where geese cause damage or pose threats, geese are likely to return regardless of the methods employed. Appendix B of the EA discusses WS' recommendation and direct use of limited habitat alterations (e.g., vegetative barriers). Under the alternatives where habitat alterations would be available for use by WS, WS' involvement in or recommendation of habitat alterations would be limited and would not involve large scale modifications of habitat. Many habitat alterations that would discourage geese from using an area could also render an area aesthetically displeasing to property owners. For example, vegetative barriers can prevent geese from exiting bodies of water onto lawns where they can cause damage or pose threats. Vegetative barriers normally consist of dense, thick vegetation that is relatively tall when compared to the size of Canada geese. Some people find tall vegetation aesthetically displeasing which can prevent their access to waterfronts or views of water bodies. In addition, some habitat modifications that would act as long-term solutions to resolving damage or threats associated with geese would require environmentally unacceptable practices to many people. For example, geese in urban environments tend to forage near bodies of waters (Conover and Kania 1991). Draining water bodies in areas where geese are present would require State and federal permits which were discussed in the EA. The draining of wetlands or other water bodies would be unacceptable to some segments of society but would act as a long term solution.

Comment 27 – Few, if any, serious pathogens are normally associated with fresh goose excrement

Several studies that have documented the presence of pathogens in goose feces were discussed in Section 1.2 of the EA. The EA also states that many of the pathogens that have been found in goose feces can also be contracted from other sources in the environment which makes identifying the source of a

contaminations or outbreaks extremely difficult. Geese are often associated with human activities and often exhibit gregarious behavior (*i.e.*, found in flocks or large groups) which increases the chances of disease transmission, especially when fecal droppings occur in areas with high public use. While transmission of diseases or parasites from geese to humans has not been well documented, the potential exists (Luechtefeld et al. 1980, Wobeser and Brand 1982, Hill and Grimes 1984, Pacha et al. 1988, Blandespoor and Reimink 1991, Graczyk et al. 1997, Saltoun et al. 2000).

The primary route of infection is through incidental contact with contaminated material. Direct contact with fecal matter is not a likely route of transmission of waterfowl zoonoses unless ingested directly. Although intentional contact with feces is not likely, transmission can occur when people unknowingly contact and ingest contaminated material. Therefore, the risk to human health from zoonoses is low and a direct link of transmission from geese to humans is difficult to determine, especially given that many pathogens occur naturally in the environment or can be attributed to contamination from other sources. The presence of disease causing organisms in goose feces increases the risks of exposure and transmission of zoonoses wherever people may encounter large accumulations of feces from geese. Even though many people are concerned about disease transmission from feces, the probability of contracting a disease from feces is believed to be small.

Comment 28 – Aircraft striking birds is minute beyond calculation

The comment states that the likelihood of an aircraft striking a goose “...*is vanishingly remote; low beyond the ability to realistically calculate*”. In addition, the comment states that “*millions of starlings are lethally culled within the U.S. each year but the statistical chance of any one of them coming into contact with an airplane is minute beyond calculation*”.

The need to reduce threats to aviation safety was specifically addressed in Section 1.2 of the EA. When geese are in close proximity to airports and/or airbases, those geese have a higher likelihood of being struck by aircraft when compared to geese that may be present in rural areas. As was stated throughout the EA, WS only responds and initiates activities when requested by other entities. The statistical analogies provided by the commenter assume all geese are addressed by WS to alleviate damage associated with aircraft strikes and that all geese have an equal chance of being struck by aircraft. However, as previously stated, those geese present on airport property or in close proximity to airports, whether those geese are resident or migratory geese, pose a higher likelihood of being struck by aircraft when compared to geese that may be present in rural areas that are not in close proximity to an airport.

Nationally, the resident Canada goose population probably represents the single most serious bird threat to aircraft safety (Alge 1999, Seubert and Dolbeer 2004, Dolbeer and Seubert 2006). Resident Canada geese are of particular concern to aviation because of their large size (typically 8-15 lbs which exceeds the 4-lb bird certification standard for engines and airframes); flocking behavior (which increases the likelihood of multiple bird strikes); attraction to airports for grazing; and year-around presence in urban environments near airports (Seubert and Dolbeer 2004). From 1990-2007 there were 1,109 reported strikes involving Canada geese in the United States, resulting in over \$47 million in damage and associated costs to civil aircraft (Dolbeer and Wright 2008). The United States Air Force (USAF) reported that Canada geese have caused over \$92 million in damage and have been involved in 130 strikes since the beginning of their recording period through 2007, averaging over \$710,000 in damages per strike (USAF 2007). In 1995, a Boeing 707 E38 AWACS jet taking off from Elmendorf Air Force Base in Alaska ingested at least 13 geese into the number 1 and 2 engines and crashed, killing all 24 crew members. Bird strikes cause an estimated seven fatalities involving civilian and military aircraft each year (Linnell et al. 1996). For the period 1990-2000, waterfowl (geese and ducks) comprise 11% of all bird-aircraft strikes to civil aviation reported to the FAA for which the bird species or group was reported (Cleary et al. 2002). For the period 1990-2000, more than 50% of Canada goose-aircraft strikes resulted

in damage to the aircraft, and 28.5% resulted in a negative effect on the flight (Cleary et al. 2002). The likelihood of an aircraft striking a Canada goose increases when those geese are in close proximity to an airport. Thus, when conducting damage management activities to alleviate threats to aircraft, WS targets those geese on or near an airport where those threats are occurring and does not target all geese that may be present in the State.

Comment 29 – The best defense against an aggressive goose is to leave it alone

The EA addresses the aggressive behavior associated with Canada geese in defense of nesting territories and goslings under Section 1.2. The comment states that “[t]he best defence [sic] against a defensive goose is common sense; leave it alone”. Though geese attacking humans occurs rarely, aggressive behavior by geese does occur, especially during nest building and the rearing of eggs and chicks. As people are increasingly living with wildlife, the lack of harassing and threatening behavior by humans toward many species of wildlife, especially around urban areas, has led to a decline in the fear wildlife have toward humans. When wildlife species begin to habituate to the presence of humans and human activity, a loss of apprehension occurs that can lead those species to exhibit threatening behavior toward humans. This threatening behavior continues to increase as human populations expand and the populations of those species that adapt to human activity increase. Threatening behavior can be in the form of aggressive posturing, a general lack of apprehension toward humans, or abnormal behavior.

In most circumstance, people use common sense when encountering wildlife and leave those species alone. However, in some circumstances, the aggressive behavior of geese toward people and pets occurs in areas where avoiding geese is difficult. For example, if a goose nests in an area near an entrance to a building or near a walkway to a building, the aggressive behavior of geese can be difficult to avoid. In addition, children may be unaware of the dangers associated with geese and unknowingly approach an aggressive goose in a park. In those situations, WS may be requested to address aggressive geese using those methods addressed in Appendix B, if available under the selected alternative.

Comment 30 – Canada geese are commonly, but incorrectly, presented as a risk to other waterfowl

The comment states that “...urban and suburban Canada geese are not a risk to native waterfowl, who do not generally share their nesting habitat”. The comment further addresses the co-evolutionary nature of Canada geese and other waterfowl and their use of differing habitats which provides proof that geese do not pose a risk to other waterfowl.

The EA does not discuss interactions between Canada geese and other waterfowl nor does the EA state that geese negatively affect waterfowl in the State. WS has not received requests for assistance to manage competition between Canada geese and other waterfowl in the State. The potential for negative interactions between geese and other waterfowl was not identified for discussion in the need for action section of the EA.

Comment 31 – Disease threats attributed to geese are inaccurate and overstated

Threats to human safety associated with geese were discussed in Section 1.2 of the EA. Risks to human safety posed by geese are primarily associated fecal matter deposited by geese in areas where people could come into contact with those droppings. Geese are known to pass pathogens encountered in their environment through their digestive tract which can be present in their fecal droppings. There are several pathogens involving waterfowl which may be contracted by humans; however, the risk of infection is believed to be low (Centers for Disease Control and Prevention 1998). The primary route of infection is through incidental contact with contaminated material. Direct contact with fecal matter is not a likely route of transmission of waterfowl zoonoses unless ingested directly. Although intentional contact with

feces is not likely, transmission can occur when people unknowingly contact and ingest contaminated material. Therefore, the risk to human health from zoonoses is low and a direct link of transmission from geese to humans is difficult to determine, especially given that many pathogens occur naturally in the environment or can be attributed to contamination from other sources. Flemming et al. (2001) reviewed the impacts of Canada geese on water quality by addressing pathogens and nutrient loading and identified a number of hazards that geese are associated with. However, the presence of disease causing organisms in goose feces increases the risks of exposure and transmission of zoonoses wherever people may encounter large accumulations of feces from geese.

The absence of records of disease occurrence in Rhode Island does not mean absence of risk but may only mean lack of reliable research in this area. Few studies are available on the occurrence and transmission of zoonotic diseases in wild birds. Study of this issue is complicated by the fact that some disease-causing agents associated with birds, may also be contracted from other sources. WS works with cooperators on a case-by-case basis to assess the nature and magnitude of the wildlife conflict including providing information on the limitations about what we know regarding health risks associated with geese. It is the choice of the individual cooperator to tolerate the potential health risks or to seek to reduce those risks. WS' clearly and repeatedly states in section 1.2 of the EA that the possibility of disease transmission from geese to humans is low but the potential exists for transmission since geese are known to harbor infectious diseases, particularly in feces. Where humans may contact feces, such as parks, industrial complexes, and golf courses the risk of disease transmission increases. Therefore, WS' makes no attempt to overstate the threat of disease transmission between humans and Canada geese in Rhode Island.

As was stated in the EA and reiterated here, the risks to human safety from disease transmission to humans is very low but the ability for disease-causing pathogens to be present in goose feces and the likelihood of people encountering feces containing pathogens in public-use areas increases those risks. Therefore, the risks in the EA are not overstated and are not inaccurate.

Comment 32 – A suite of methods do exist that are cost-effective in reducing Canada goose damage

The comment lists several methods that have been deemed cost-effective in reducing damage by the commenter. The methods listed by the commenter were all non-lethal methods and involved the use of effigies, harassment methods, habitat modifications, egg oiling/addling, reproductive inhibitors, repellents, exclusion methods, feeding bans, use of ornamental waterfowl, and public education. Of the methods listed by the comment, only the use of ornamental waterfowl was not discussed in the EA. Those methods discussed in the EA and in the comment could be employed under any of the alternatives by those entities experiencing damage or threats when permitted and could be used by WS (excluding the use of ornamental waterfowl) under any of the alternatives except the no involvement by WS alternative. The use of ornamental waterfowl to discourage geese from using an area was not addressed in the EA since the use of that particular method would involve the introduction of non-native species into the natural environment. In addition to ornamental waterfowl being a non-native species that can compete with native wildlife, non-native wildlife can also be associated with causing damage or posing risks of damage. Those methods included in the comment, except the introduction of non-native wildlife, could be employed by WS under the alternatives addressed in the EA except the no involvement by WS alternative.

Literature Cited

Alge, T.L. 1999. Airport bird threat in North America from large flocking birds, (geese) as viewed by an engine manufacturer. Proceedings of the Joint Birdstrike Committee - USA/Canada meeting, Vancouver, B.C. pp. 11-22.

- Avery, M.L., K.L. Keacher, and E.A. Tillman. 2008. Nicarbazine bait reduces reproduction in pigeons (*Columba livia*). *Wildlife Research* 35:80-85.
- Blandespoor, H.D., and R.L. Reimink. 1991. The control of swimmer's itch in Michigan: past, present and future. *Michigan Academ.* XXIV, pp 7-23.
- Centers for Disease Control and Prevention. 1998. Cryptosporidiosis: Fact Sheet. Nat. Center for Infect. Dis., Div. Paras. Dis. 3 pp.
- Cleary, E.C., S.E. Wright, and R.A. Dolbeer. 2002. Wildlife strikes to civil aircraft in the United States, 1990 - 2000. Serial report Number 7. Federal Aviation Administration, Office of Airport Safety and Standards, Washington, D.C. 36 pp.
- Conover, M.R., and G.S. Kania. 1991. Characteristics of feeding sites used by urban-suburban flocks of Canada geese in Connecticut. *Wildl. Soc. Bull.* 19:36-38.
- Cooper, J.A., and T. Keefe. 1997. Urban Canada goose management: policies and procedures. *Trans. No. Am. Wildl. And Natural Resour. Conf.* 62:412-430.
- Decker, D.J., and K.G. Purdy. 1988. Toward a concept of wildlife acceptance capacity in wildlife management. *Wildlife Society Bulletin* 16:53-57.
- Dolbeer, R.A., and J.L. Seubert. 2006. Canada goose populations and strikes with civil aircraft: positive trends for aviation industry. Poster Presentation for 8th Bird Strike Committee-USA/Canada meeting, St. Louis, Missouri, 21-24 August 2005.
- Dolbeer, R.A., and S.E. Wright. 2008. Wildlife strikes to civil aircraft in the United States, 1991 - 2007. Federal Aviation Administration. Airport Safety and Operations. Washington, DC. 34 pp.
- Eccleston, C. 1995. Determining when an analysis contains sufficient detail to provide adequate NEPA coverage. *Federal Facilities Environmental Journal*, Summer Pp. 37-50.
- EPA. 2005. Pesticide Fact Sheet: Nicarbazine – Conditional Registration. United States Environmental Protection Agency, Office of Prevention, Pesticides, and Toxic Substances, Washington, DC 20460.
- Fleming, R., P. Eng, and H. Fraser. 2001. The impact of waterfowl on water quality: literature review. Ridgetown College-University of Guelph, Ridgetown, Ontario Canada. 14 pp.
- Graczyk, T.K., M.R. Cranfield, R. Fayer, J. Tout, and J.J. Goodale. 1997. Infectivity of *Cryptosporidium parvum* oocysts is retained upon intestinal passage through a migratory waterfowl species (Canada Goose, *Branta canadensis*). *Tropical Med. International Heal.* 2:341-347.
- Hill, G.A., and D.J. Grimes. 1984. Seasonal study of a freshwater lake and migratory waterfowl for *Campylobacter jejuni*. *Can. J. Microbiol.* 30:845-849.
- Linnell, M.A., M.R. Conover, and T.J. Ohashi. 1996. Analysis of bird strikes at a tropical airport. *J. Wildl. Manage.* 60:935-945.

- Luechtefeld, N.W., M.J. Blaser, L.B. Reller, and W.L.L. Wang. 1980. Isolation of *Campylobacter fetus* subsp. *jejuni* from migratory waterfowl. *J. Clin. Microbiol.* 12:406-408.
- Pacha, R.E., G.W. Clark, E.A. Williams, and A.M. Carter. 1988. Migratory birds of central Washington as reservoirs of *Campylobacter jejuni*. *Can. J. Micro.* 34:80-82.
- Reinoso, V., R. Katani, and G.F. Barbato. 2010. Nicarbazin reduces egg production and Fertility in the white pekin duck. Unpublished manuscript.
- Saltoun, C.A., K.E. Harris, T.L. Mathisen, and R. Patterson. 2000. Hypersensitivity pneumonitis resulting from community exposure to Canada Goose droppings: when an external environmental antigen becomes an indoor environmental antigen. *Annal. Allergy Asth. Immun.* 84:84-86.
- Seubert, J.L., and R.A. Dolbeer. 2004. Status of North American Canada Goose populations in relation to strikes with civil aircraft. Bird strike committee. 13-17 Sept. 2004.
- Slate, D.A., R. Owens, G. Connolly, and G. Simmons. 1992. Decision making for wildlife damage management. *Trans. N. A. Wildl. Nat. Res. Conf* 57:5162.
- Smith, A.E., S.R. Craven, and P.D. Curtis. 1999. Managing Canada geese in urban environments. Jack Berryman Institute Publication 16, and Cornell University Cooperative Extension, Ithaca, New York. 42 pp.
- The Wildlife Society. 1992. Conservation policies of the Wildlife Society. The Wildlife Society. Washington, D.C. 20 pp.
- USAF. 2007. Bird/Wildlife Aircraft Strike Hazard (BASH): Strike Statistics. http://afsafety.af.mil/SEF/Bash/SEFW_stats.shtml. Accessed on December 3, 2007.
- USDA. 1997. Animal Damage Control Program – Final Environmental Impact Statement (revised). USDA, APHIS, WS-Operational Support Staff. Riverdale, Maryland.
- USFWS. 2005. Final Environmental Impact Statement: Resident Canada goose management. United States Fish and Wildlife Service, Division of Migratory Birds. Arlington, Virginia. <http://www.fws.gov/migratorybirds/issues/cangeese/finaleis.htm>. Accessed November 24, 2009.
- Wobeser, G., and C.J. Brand. 1982. Chlamysiosis in 2 biologists investigating disease occurrences in wild waterfowl. *Wildl. Soc. Bull.* 10:170-172.