SUPPLEMENT TO THE ENVIRONMENTAL ASSESSMENT: REDUCING BIRD DAMAGE IN THE STATE OF CONNECTICUT

United States Department of Agriculture
Animal and Plant Health Inspection Service
Wildlife Services

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INTRODUCTION

An environmental assessment (EA) was prepared by 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), and the Connecticut Department of Energy and Environmental Protection (CTDEEP) Wildlife Division, to analyze the potential impacts to the quality of the human environment from resolving or alleviating damage to agriculture, property, natural resources and threats to human health and safety caused by birds in the State of Connecticut (USDA 2013). The EA evaluated the need for bird damage management and assessed potential impacts on the human environment of five alternatives to address that need. WS' proposed action in the EA implements an integrated damage management program to fully address the need to manage bird damage and threats while minimizing impacts to the human environment. The EA analyzed the effects of WS' activities to reduce damage and threats associated with resident and migratory bird species (USDA 2013).

PURPOSE

The purpose of the EA will remain as addressed in section 1.1 of the EA (USDA 2013). This Supplement to the EA examines potential environmental impacts of WS' program as it relates to: 1) new information that has become available from research findings and data gathering since the issuance of the Decision and FONSI in 2013; 2) the inclusion of Canada geese (*Branta canadensis*), rock (feral) pigeons (*Columba livia*), European starlings (*Sturnus vulgaris*), and house (English) sparrows (*Passer domesticus*) management activities to protect agriculture, property, natural resources and human health and safety.

NEED FOR ACTION

A description of the need for action to reduce damage to resources and threats to human health and safety caused by birds in the State of Connecticut is listed in Section 1.2 of the EA (USDA 2013). The need for action addressed in the EA remains applicable to this Supplement since Canada geese, pigeons, starlings, and sparrows impact the resources listed in the EA similarly to the other species analyzed in the EA. For example, WS may be requested to reduce threats caused by Canada geese at and around airports. This could be accomplished through the use of corral traps to conduct roundups of flightless resident Canada geese at sites 7 to 8 miles from airports based on resident goose movement distances determined by Groepper et al (2008).

Some species of wildlife have adapted to and have thrived in human altered habitats. Birds, including Canada geese, rock pigeons, European starlings, and house sparrows in particular, are often responsible for conflicts with people. Those conflicts often lead people to request assistance with reducing damage to resources and to reduce threats to human safety. The need for action to manage damage and threats associated with birds in Connecticut arises from requests for assistance[8] received by WS to reduce and prevent damage from occurring to four major categories. Those four major categories include agricultural resources, property, natural resources, and threats to human safety. WS has identified those bird species most likely to be responsible for causing damage to those four categories based on previous requests for assistance and assessments of the threat of bird strike hazards at airports.

RELATIONSHIP OF THIS DOCUMENT TO OTHER ENVIRONMENTAL DOCUMENTS

WS' Environmental Assessments - *Environmental Assessment- Canada Goose Damage Management in the State of Connecticut* (USDA 2004) and *Reducing Pigeon, Starling, and Sparrow Damage through an Integrated Wildlife Damage Management Program in the State of Connecticut* (USDA 2007): WS has previously developed EAs that analyzed the need for action to manage damage associated with Canada geese, rock pigeons, European starlings, and house sparrows.

The Canada goose EA identified issues associated with goose damage management and analyzed alternatives to address those issues. After review of the analyses in the EA, a FONSI was signed on July 15, 2004, selecting the proposed action to implement an integrated approach to managing goose damage. Similarly, the pigeon, starling, and sparrow EA identified issues associated with damage to property, agriculture, and natural resources, threats to aviation safety and human health and safety, and analyzed alternatives to address those issues. After review of the analyses in the EA, a Decision and Finding of No Significant Impact (FONSI) were signed on January 4, 2007, selecting the proposed action to implement an integrated approach to managing damage.

Changes in the need for action and the affected environment have prompted WS and cooperating agencies to initiate this new analysis for Canada geese and pigeons, starlings, and sparrows into this Supplement addressing the need for bird damage management. This Supplement to the EA will address more recently identified changes and will assess the potential environmental impacts of program alternatives based on a new need for action, primarily a need to address damage and threats of damage associated with Canada geese and pigeons, starlings, and sparrows. Since activities conducted under the previous EAs will be re-evaluated under this EA to address the new need for action and the associated affected environment, the previous EAs that addressed Canada geese and pigeons, starlings, and sparrows will be superseded by this analysis and the outcome of the Decision issued based on the analyses in this Supplement to the EA.

AUTHORITY AND COMPLIANCE

WS' activities to reduce damage and threats associated with wildlife are regulated by federal, state, and local laws and regulations. The authority of WS and other agencies along with compliance with relevant laws and regulations are discussed in detail in section 1.6 of the EA (USDA 2013). Compliance with laws and regulations not directly addressed in the EA will be discussed in this supplement.

RELATIONSHIPS OF AGENCIES DURING PREPARATION OF THIS EA SUPPLEMENT

Based on agency relationships, Memorandums of Understanding (MOUs), and legislative authorities, WS was the lead agency during the development of the EA and the Supplement to the EA, and therefore, was responsible for the scope, content, and decisions made. The USFWS and the CTDEEP provided input throughout the EA preparation to ensure an interdisciplinary approach in compliance with NEPA and agency mandates, policies, and regulations.

SCOPE OF ANALYSIS

The EA and this Supplement evaluate Canada goose and pigeon, starling, and sparrow damage management eliminate or alleviate damage and threats to agriculture, property, natural resources, and human health and safety. Unless otherwise discussed in this Supplement, the scope of analysis remains valid as addressed in the EA.

Actions Analyzed

The EA evaluates the need for bird damage management to reduce threats and damage occurring to agriculture, property, natural resources, and human health and safety wherever such management is requested

from the WS program. This Supplement discusses the issues associated with continuing bird damage management to meet the need for action while addressing those issues.

WS uses a decision model based on a publication by Slate et al. (1992) which involves evaluating each threat or damage situation, taking action, evaluating the action, and monitoring results of the actions taken. The published article provides more detail on the processes used in WS' Decision Model. WS' personnel use the Decision Model to develop the most appropriate strategy to reduce damage and to determine potential environmental effects from damage management actions (Slate et al. 1992).

The methods available for use under the alternatives evaluated are provided in Appendix B of the EA (USDA 2013). The alternatives and Appendix B in the EA also discuss how methods would be employed to manage damage and threats to agriculture, property, natural resources, and human health and safety.

The Migratory Bird Treaty Act (MBTA) makes it unlawful to pursue, hunt, take, capture, kill, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or their parts, nests, or eggs (16 U.S.C 703-711). A list of bird species protected under the MBTA can be found in 50 CFR 10.13.

The MBTA does allow for the lethal take of those bird species listed in 50 CFR 10.13 when depredation occurs through the issuance of depredation permits or the establishment of depredation orders. Under authorities in the MBTA, the USFWS is the federal agency responsible for the issuance of depredation permits or the establishment of depredation orders for the take of those protected bird species when damage or threats of damage are occurring. Information regarding migratory bird permits can be found in 50 CFR 13 and 50 CFR 21.

The USFWS is a cooperating agency on this Supplement to analyze cumulative take of migratory birds from the issuance of depredation permits to entities within the State. The USFWS has jurisdiction over the management of migratory birds and has specialized expertise in identifying and quantifying potential adverse effects to the human environment from bird damage management activities. The analyses in this Supplement and the analyses in the EA would ensure the compliance of the USFWS with the NEPA for the issuance of depredation permits for the take of Canada geese.

Native American Lands and Tribes

The WS program in Connecticut would only conduct damage management activities on Native American lands when requested by a Native American Tribe and only after a MOU or cooperative service agreement has been signed between WS and the Tribe requesting assistance. Therefore, the Tribe would determine when WS' assistance is required and what activities would be allowed. Because Tribal officials would be responsible for requesting assistance from WS and determining what methods would be available to alleviate damage, no conflict with traditional cultural properties or beliefs would be anticipated. Those methods available to alleviate damage associated with bird damage management on federal, state, county, municipal, and private properties under the alternatives analyzed in the EA and this Supplement would also be available for use to alleviate damage on Tribal properties when the use of those methods have been approved for use by the Tribe requesting WS' assistance. Therefore, the activities and methods addressed under the alternatives would include those activities that could be employed on Native American lands, when requested and agreed upon.

Federal, State, County, City, and Private Lands

Under four of the alternatives analyzed in detail, WS could continue to provide damage management activities on federal, state, county, municipal, and private land in Connecticut when a request is received for such services by the appropriate property owner or manager. In those cases where a federal agency requests WS' assistance with managing bird damage management, the requesting agency would be responsible for analyzing those activities in accordance with the NEPA. However, the EA and this Supplement would cover

such actions if the requesting federal agency determined the analyses and scope of the EA and this Supplement were appropriate for those actions and the requesting federal agency adopted the EA through their own Decision based on the analyses in the EA and Supplement. Therefore, actions taken on federal lands have been analyzed in the scope of the EA and this Supplement to the EA.

Period for which this EA is valid

If the analyses in this Supplement indicates an EIS is not warranted, the EA, as supplemented, would remain valid until WS, in consultation with the USFWS and the CTDEEP, determines that new needs for action, changed conditions, new issues, or new alternatives having different environmental impacts must be analyzed. Monitoring of activities ensures the EA remains appropriate to the scope of damage management activities conducted by WS.

Site specificity

The site specificity of the EA will remain as addressed in section 13 of the EA (USDA 2013). The EA analyzes the potential impacts of bird damage management and addresses activities on all public and private lands within the State of Connecticut under MOUs, Cooperative Agreements, and in cooperation with the appropriate public land management agencies. It also addresses the impacts of bird management in areas where additional agreements may be signed in the future.

The analyses in the EA and this Supplement are intended to apply to any action that may occur in any locale and at any time within the State of Connecticut. In this way, WS believes it meets the intent of the NEPA with regard to site-specific analysis and that this is the only practical way for WS to comply with the NEPA and still be able to address bird damage and threats to agriculture, property, natural resources, and human health and safety.

Public Involvement

Issues related to the proposed action were initially developed by an interdisciplinary team involving the CTDEEP and USFWS. This multi-agency team refined the issues and identified preliminary alternatives. An invitation for public comment letter on the pre-decisional EA was sent to 181 individuals or organizations identified as interested in Connecticut WS or CTDEEP projects. Notice of the proposed action and invitation for public involvement on the pre-decisional EA was placed in the *Providence Journal* newspaper with statewide circulation. There was a 33-day comment period for the public to provide input on the pre-decisional EA. One comment letter was received from the public after review of the pre-decisional EA. All comments were analyzed to identify substantial new issues, alternatives, or to redirect the program. A Decision and FONSI was signed for the EA on August 16, 2013. No comments were received.

This Supplement, along with the EA (USDA 2013), and the associated Decisions and FONSI will be made available for public review and comment through the publication of a legal notice announcing a minimum of a 30-day comment period. The legal notice will be published at a minimum in *Hartford Courant*, sent to interested parties via the APHIS stakeholder registry, and posted on the APHIS website. Comments received during the public involvement process will be fully considered for new substantive issues and alternatives.

DECISIONS TO BE MADE

Based on the scope of the EA and this supplement, the decisions to be made are: 1) How can WS best respond to the need to reduce bird damage in Connecticut; 2) Do the alternatives have significant cumulative impacts meriting an Environmental Impact Statement (EIS)?

ISSUES ADDRESSED IN DETAIL

The issues analyzed in detail are discussed in Chapter 2 of the EA (USDA 2013). Alternatives developed and identified during the development of the EA to address those issues are discussed in Chapter 3 of the EA (USDA 2013). The following issues were identified during the scoping process for the EA:

- Effects on Target Species Populations
- Effects of Control Methods on Non-target Wildlife Species Populations, Including T&E Species
- Effects of Control Methods on Human Health and Safety
- Effects on the Aesthetic Values of Birds
- Humaneness and Animal Welfare Concerns of Methods
- Effects of Bird Damage Management Activities on the Regulated Harvest of Birds
- Effectiveness of Bird Damage Management Methods

Based on those damage management activities conducted previously by WS since the Decision and FONSI were signed in 2013 and in consultation with the USFWS and the CTDEEP, no additional issues have been identified that require detailed analyses. Those issues identified during the development of the EA remain applicable and appropriate to resolving damage and threats of damage associated with birds, including rock pigeons, European starlings, house sparrows, and Canada geese.

ALTERNATIVES INCLUDING THE PROPOSED ACTION

The alternatives considered and evaluated using the identified issues are described and discussed in detail in Chapter 3 of the EA (USDA 2013). In addition, Chapter 4 of the EA analyzes the environmental consequences of each alternative as those alternatives relate to the issues identified (USDA 2013). Appendix B of the EA provides a description of the methods that could be used or recommended by WS under each of the alternatives. The EA describes three potential alternatives that were developed to address the issues identified above. Alternatives analyzed in detail include:

- Alternative 1 - Continuing the Current Integrated Approach to Managing Bird Damage (Proposed Action/No Action)
- Alternative 2 - Bird Damage Management by WS through Technical Assistance Only
- Alternative 3 - No Bird Damage Management Conducted by WS

STANDARD OPERATING PROCEDURES FOR BIRD DAMAGE MANAGEMENT TECHNIQUES

SOPs improve the safety, selectivity, and efficacy of wildlife damage management activities. The WS program in the State of Connecticut uses many such SOPs which are discussed in detail in Chapter 3 of the EA (USDA 2013). Those SOPs would be incorporated into activities conducted by WS when addressing bird damage management.

ENVIRONMENTAL CONSEQUENCES FOR ISSUES ANALYZED IN DETAIL

The major issues are discussed in detail in Chapter 2 of the EA (USDA 2013). Alternatives developed and identified during the development of the EA to meet the need for action and to address those issues are discussed in Chapter 3 of the EA (USDA 2013). Potential impacts of Alternative 2 and Alternative 3 on the human environment related to the major issues have not changed from those described and analyzed in the EA and thus do not require additional analyses in this Supplement. Chapter 4 of the EA contains a detailed discussion and comparison of the identified alternatives and the major issues (USDA 2013). The issues were identified as important to the scope of the analysis in the EA (40 CFR 1508.25). Alternative 1 (proposed action/no action), as described in the EA, addresses requests for bird damage management using an integrated damage management approach by WS. The following is an analysis of potential impacts for each of the major issues analyzed in the EA since the completion of the EA as related to Alternative 1 (proposed action/no action alternative):

Issue 1 – Effects of Damage Management Activities on Target Bird Populations including Canada Geese, Rock Pigeons, European Starlings and House Sparrows

A common concern when addressing damage associated with bird species are the effects on the populations of those species from methods used to manage damage. The integrated approach of managing damage associated with wildlife described in the EA under the proposed action alternative uses both non-lethal and lethal methods to resolve requests for assistance. Although non-lethal methods can disperse wildlife from areas where application occurs, wildlife is generally unharmed. Therefore, adverse effects are not often associated with the use of non-lethal methods. However, methods used to lethally take birds can result in local reductions in those species' populations in the area where damage or threats of damage were occurring.

Magnitude can be described as a measure of the number of animals killed in relation to their abundance. Magnitude may be determined either quantitatively or qualitatively. Quantitative determinations are based on population estimates, allowable harvest levels, and actual harvest data. Qualitative determinations are based on population trends and harvest data when available. Generally, WS only conducts damage management on species whose population densities are high. WS' take is monitored by comparing numbers of animals 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. All lethal take of birds by WS occurs at the requests of a cooperator seeking assistance and only after the appropriate permit has been issued by the USFWS, when appropriate.

The issue of the effects on target bird species arises from the use of non-lethal and lethal methods identified in the EA to address the need for reducing damage and threats associated with those bird species addressed in the EA. The EA found that when WS' activities are conducted within the scope analyzed in the EA, those activities would not adversely impact bird populations in Connecticut (USDA 2013). WS' SOPs are designed to reduce the effects on bird populations and are discussed in section 3.4 of the EA (USDA 2013).

WS has provided direct damage management and technical assistance in response to requests for assistance in Connecticut since the completion of the EA. Descriptions and application of direct damage management and technical assistance projects are discussed in detail in Chapter 3 of the EA (USDA 2013). All bird damage management activities conducted by WS were pursuant to applicable federal, state, and local laws and regulations.

Information on bird populations and trends are often derived from several sources including the Breeding Bird Survey (BBS), the Christmas Bird Count (CBC), the Partners in Flight Landbird Population database, published literature, and harvest data. Further information on particular sources of information is provided below. These methods remain applicable as described in the 2013 EA unless noted below.

Partners in Flight Landbird Population Estimate

The BBS data are intended for use in monitoring bird population trends, but it is also possible to use BBS data to develop a general estimate of the size of bird populations. Using relative abundances derived from the BBS, Rich et al. (2004) extrapolated population estimates for many bird species in North America as part of the Partners in Flight Landbird Population Estimate database. The Partners in Flight system involves extrapolating the number of birds in the 50 quarter-mile circles (total area/route = 10 mi^2) survey conducted during the BBS to an area of interest. The model used by Rich et al. (2004) makes assumptions on the detectability of birds, which can vary for each species. Some species of birds that are more conspicuous (visual and auditory) are more likely to be detected during bird surveys when compared to bird species that are more secretive and do not vocalize often. Information on the detectability of a species is combined to create a detectability factor which may be combined with relative abundance data from the BBS to yield a population estimate (Partners in Flight Science Committee 2013).

Annual Harvest Estimate

Many bird species addressed in the EA are classified as game species by the USFWS and CTDEEP as are Canada geese addressed in this Supplement to the EA and can be harvested during annual hunting seasons which are regulated by the USFWS and/or CTDEEP. With management authority over migratory game birds, the USFWS and CTDEEP can adjust take levels to ensure population objectives. WS reports all take to the USFWS or CTDEEP, depending on species, for consideration in the management of wildlife populations. Similarly, where available, harvest data is included in WS' analysis for magnitude of impact on populations.

Population Impact Analysis from WS' activities in Connecticut from FY 2013 through FY 2014

WS has provided direct damage management and technical assistance in response to requests for assistance with bird damage and threats in Connecticut since the completion of the EA and the Decision/FONSI signed in 2013. All bird damage management activities conducted by WS were pursuant to relevant federal, state, and local laws and regulations, and were conducted within the parameters analyzed in the EA.

Direct operational assistance provided by WS included both non-lethal harassment techniques and the lethal removal of target bird species. Between FY 2013 and FY 2014, WS non-lethally dispersed a total of 13,093 individuals of 37 target bird species, killed a total of 162 individuals of 14 target bird species, and destroyed 285 nests of two target bird species (Table 1).

All lethal take and nest destruction of target bird species in the EA (USDA 2013) was below the annual level of take analyzed.

Table 1 – Species non-lethally dispersed, lethally removed, live captured and relocated, and nests destroyed by WS during bird damage management activities in Connecticut, FY 2013 – FY 2014

	# Dispersed		# Killed		Nests Destroyed	
Species	2013	2014	2013	2014	2013	2014
Buntings, Snow	0	75	0	8	0	0
Cormorant, Double-crested	39	45	3	0	0	0
Cowbirds, Brown-headed	0	85	0	0	0	0
Crows, American	5,043	2,199	14	13	0	0
Doves, Mourning	177	177	12	3	0	0
Ducks, American Black	393	202	2	2	0	0
Ducks, Gadwall	40	0	0	0	0	0
Ducks, Mallard	913	513	24	10	0	0
Ducks, Common Merganser	0	5	0	0	0	0
Ducks, Hooded Merganser	58	40	2	0	0	0
Ducks, Ring-necked	10	0	0	0	0	0
Ducks, Blue-winged Teal	0	2	0	0	0	0
Ducks, Green-winged Teal	143	0	0	0	0	0
Ducks, American Wigeon	270	0	0	0	0	0
Ducks, Wood	0	23	0	0	0	0
Egrets, Great	13	17	0	4	0	0
Egrets, Snowy	12	4	0	1	0	0
Falcons, American Kestrel	14	6	0	0	0	0
Gulls, Great Black-backed	3	6	0	3	2	3
Gulls, Herring	578	541	12	27	189	91
Gulls, Ring-billed	1,112	2	11	0	0	0
Hawks, Cooper's	1	1	0	0	0	0
Hawks, Northern Harrier	3	5	0	0	0	0
Hawks, Red-tailed	19	29	0	0	0	0
Herons, Great Blue	7	7	1	3	0	0

Species	# Dispersed		# Killed		Nests Destroyed	
	2013	2014	2013	2014	2013	2014
Herons, Black-crowned Night	2	1	0	0	0	0
Herons, Green	1	0	0	0	0	0
Ibises, Glossy	0	2	0	0	0	0
Killdeers	69	5	0	0	0	0
Kingfishers, Belted	0	3	0	0	0	0
Larks, Horned	0	48	0	0	0	0
Ospreys	30	40	4	3	0	0
Owls, Snowy	0	4	0	0	0	0
Ravens, Common	1	0	0	0	0	0
Robins, American	20	0	0	0	0	0
Terns, Least	1	0	0	0		0
Vulture, Turkey	23	11	0	0	0	0
TOTAL	8,995	4,098	85	77	191	94

Canada Geese

CT population estimate:	26,980*	Average annual harvest, 2010-2014:	2,683
IUCN Status:	Least Concern	WS proposed take:	700
CT CBC Trend 1966-2013:	Increasing	WS proposed nests with eggs:	350
CT BBS, 1966-2012:	8.50%	WS take as % of state breeding population:	12.88%
CT BBS, 2002-2012:	8.66%	Cumulative take as % of state population:	21.74%
Eastern BBS, 1966-2012:	12.85%	New England/Mid-Atlantic BBS, 1966-2012:	8.54%
Eastern BBS, 2002-2012:	11.95%	New England/Mid-Atlantic BBS, 2002-2012:	8.17%

*Estimate from 2014 Atlantic Flyway Breeding Waterfowl Plot Survey (Klimstra et al. 2014)

There are two types of Canada geese that inhabit Connecticut during the year, resident and migratory. Canada geese are considered resident in the state when nesting and/or residing on a year around basis, when nesting in the state during the months of March, April, May, or June, or residing in the state during the months of April, May, June, July, August (Rusch et al. 1995, Ankney 1996, USFWS 2005). Most requests for assistance received by WS occur under the criteria where geese present are considered resident.

Resident Canada Geese

The average annual Atlantic Flyway Breeding Waterfowl Plot Survey population estimates for resident Canada geese in the State from 2010 through 2014 (Klimstra et al. 2014) are shown in Table 2. In 1999, the population objective for resident Canada geese in the state was established at 15,000 individuals (Atlantic Flyway Council 2011, USFWS 2005).

Canada geese can be harvested during regulated hunting seasons. Under frameworks developed by the USFWS, the CTDEEP 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 is intended to target resident geese specifically.

The take of geese under the depredation orders that allow for the take of Canada geese once certain conditions have been met must be reported to the USFWS. Therefore, the cumulative impacts of the proposed action on resident Canada geese populations are based upon the anticipated WS' take, hunter harvest, and authorized take by other entities (e.g., agricultural producers, municipalities, homeowners associations, airports) through the issuance of depredation permits or under the depredation orders. The cumulative take of geese in Connecticut from 2010 through 2014 is shown in Table 2.

Table 2. Resident Canada goose population estimates and number addressed and harvested in Connecticut from FY 2010 to FY 2014

Year	Estimated Population[1]	Hunter Harvest[2]	Dispersed by WS[3]	Total Take Authorized by USFWS[4]	Take under Depredation Permits		
					WS' Take[3]	Non-WS' Take[5]	Total Take by All Entities
2010	31,272	9,075	1,957	1,792	167	509	676
2011	23,959	8,807	326	1,519	51	454	505
2012	21,555	9,521	498	1,479	38	567	602
2013	32,114	7,912	113	1,619	72	593	603
2014	26,003	8,648	156	1,339	21	94	115
AVERAGE	**22,483**	**8,7927**	**508**	**1,458**	**69**	**443**	**500**

[1] Estimate based on Atlantic Flyway Breeding Waterfowl Plot Survey (Klimstra et al. 2014)
[2]Raftovich et al 2014, Raftovich et al 2012, Raftovich et al 2010
[3]WS' take is reported by federal fiscal year
[4]Data provided by the USFWS (J. Ratcliffe, USFWS pers. comm. 2014)
[5]Data reported by calendar year

As part of an integrated approach, WS has also employed pyrotechnics, human presence, the noise associated with the discharge of a firearm, and other non-lethal methods to disperse 3,050 geese between FY 2010 and FY 2014, averaging 508.3 annually. Of the total number of geese addressed by WS from FY 2010 through FY 2014, over 89.73% were addressed using non-lethal methods.

Direct, Indirect, and Cumulative Effects:
Based on previous requests for assistance, WS anticipates up to 500 geese total could be lethally taken by WS annually based on previous requests for assistance and in anticipation of the need to address additional requests for assistance, including take that could occur at airports. In addition, the nests and/or eggs of resident Canada geese could be destroyed by WS as part of an integrated approach to managing damage. Under the proposed action alternative, up to 250 nests could be destroyed annually by WS. WS' take of nests and/or eggs would only occur when permitted by the or through registration with USFWS. No nest treatment of resident Canada geese would occur by WS without a depredation permit issued by the USFWS and co-signed by the CTDEEP or as an agent on an online registration issued by the USFWS. Therefore, WS take would only occur at the discretion of the USFWS after population objectives for geese are considered.

Based on the best scientific data, WS proposed removal level will have no adverse direct effects on the resident goose population. Additionally, the potential authorized removal from all non-WS entities combined with WS proposed removal is not expected to create adverse cumulative impacts.

Migratory Canada Geese

Migratory Canada geese breed in Canada and Alaska and winter in the continental United States. Breeding populations that winter in Connecticut are typically from three breeding populations. These are the North Atlantic Population (NAP), Southern James Bay Population (SJBP), and the Atlantic Population (AP) of Canada geese. 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 (i.e., present in the state throughout the year) can also be difficult under field conditions. Therefore, for the purposes of this analyses, those Canada geese present in the state from September through March will be considered as migratory geese, although resident geese regularly begin nesting in March throughout the state and nesting geese can be clearly identified as being resident.

Frameworks have been established by the USFWS and implemented by the CTDEEP to allow for the harvest of geese during those months when geese present in the state could be migratory. The September season is intended to manage populations of resident geese. Although migratory geese could be present during September, the majority of geese present are likely geese that nested within the state. This is based on band recovery data, collar observations, and radio satellite data which indicate that the September season is virtually entirely free of migratory birds in neighboring Massachusetts (H. Heusmann, MDFW pers. comm.

2011). Dunn and Jacobs (2000) found that from 1992 through 1999, 4.1% of the banded geese harvested in Pennsylvania during a special September season were identified as migrant geese from either the SJBP (n=24) or the AP (n=5) of Canada geese.

From FY 2010 through FY 2014, a total of 34 geese were lethally taken by WS during the period when geese present could be considered migratory (September through March) or approximately 6.8 geese per year. This represents 9.74% of the 349 geese taken by WS during the same time period. 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 would 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 would be considered migratory, WS may take up to 150 geese annually during those periods when geese could be considered migratory.

Direct, Indirect, and Cumulative Effects:
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 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 and the CTDEEP ensures cumulative take is considered as part of management objectives for Canada geese. WS' cumulative take of up to 150 geese that could be considered migratory annually would have represented almost 1.73% of the number of geese harvested during the 2014 Canada goose seasons which ran from September 2013 to February 2014. According to Lindberg and Malecki (1994) resident geese were harvested proportionally more than their availability in the population while migrants were harvested proportionally less than their availability in Crawford County, Pennsylvania during 1988 and 1989.

No take of migratory geese would occur by WS without a depredation permit issued by the USFWS. Therefore, WS take would only occur at the discretion of the USFWS after population objectives for geese are considered. Based on the best scientific data, WS proposed removal level will have no adverse direct effects on the migrant goose population. Additionally, the potential authorized removal from all non-WS entities combined with WS proposed removal is not expected to create adverse cumulative impacts.

Rock Pigeon Biology and Population Impact Analysis

CT population estimate:	4,000*	IUCN Status:	Least Concern
CT CBC Trend 1966-2013:	Decreasing	WS proposed take:	1,000
CT BBS, 1966-2012:	-3.09%	WS proposed nests with eggs:	100
CT BBS, 2002-2012:	-2.86%	WS take as % of state breeding population:	25.00%
Eastern BBS, 1966-2012:	-1.48%	New England/Mid-Atlantic BBS, 1966-2012:	-3.08%
Eastern BBS, 2002-2012:	-0.86%	New England/Mid-Atlantic BBS, 2002-2012:	-2.21%

Rock pigeons are a non-indigenous species in Connecticut that were first introduced into the United States by European settlers as a domestic bird to be used for sport, carrying messages, and as a source of food (USFWS 1981). Many of those birds escaped and eventually formed the feral pigeon populations that are now found throughout the United States, southern Canada, and Mexico (Williams and Corrigan 1994). However, because pigeons are an introduced rather than a native species, they are not protected by the MBTA or any state law.

Pigeons are closely associated with humans where human structures and activities provide them with food and sites for roosting, loafing, and nesting (Williams and Corrigan 1994). Thus, pigeons are commonly found around city buildings, bridges, parks, farmyards, grain elevators, feed mills, and other manmade structures (Williams and Corrigan 1994). Additionally, although pigeons are primarily grain and seed eaters, they will

readily feed on garbage, livestock manure, spilled grains, insects, and any other available bits of food (Williams and Corrigan 1994). In Connecticut, pigeons can be found statewide throughout the year (Johnston 1992).

Since pigeons are afforded no protection under the MBTA because the species is not native to the United States, the take of pigeons to alleviate damage or to reduce threats can occur without the need for a depredation permit from the USFWS or the CTDEEP. Therefore, take by other entities in Connecticut is unknown. From FY 2010 to FY 2014, WS employed non-lethal harassment methods to disperse 9,608 pigeons to alleviate damage or threats of damage, averaging 1,921.6 annually (see Table 3). WS also employed lethal methods to take 459 pigeons during and destroyed twelve pigeon nests containing 17 eggs during this period.

Table 3 – Number of Rock Pigeons addressed in Connecticut from FY 2010 to FY 2014

Year	Dispersed by WS[1]	WS' Take[1]	WS' Nests Destroyed
2010	3,841	38	12
2011	4,890	369	0
2012	583	10	0
2013	271	4	0
2014	23	38	0
AVERAGE	**1,921.6**	**91.8**	**2.4**

Direct, Indirect, and Cumulative Effects:
WS' proposed pigeon damage management activities would be conducted pursuant to Executive Order 13112. The Executive Order states that each federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law; 1) reduce invasion of exotic species and associated damages, 2) monitor invasive species populations, provide for restoration of native species and habitats, 3) conduct research on invasive species and develop technologies to prevent introduction, and 4) provide for environmentally sound control and promote public education on invasive species. WS' proposed removal is of a low magnitude compared with the statewide population and therefore will have no adverse direct or indirect effects on rock pigeon populations. Although non-WS removal is unknown, WS does not anticipate any significant adverse cumulative impacts on pigeon populations.

European Starling Biology and Population Impact Analysis

CT population estimate:	80,000*	IUCN Status:	Least Concern
CT CBC Trend 1966-2013:	Decreasing	WS proposed take:	30,000
CT BBS, 1966-2012:	-2.52%	WS proposed nests with eggs:	500
CT BBS, 2002-2012:	-2.80%	WS take as % of state breeding population:	37.50%
Eastern BBS, 1966-2012:	-1.34%	New England/Mid-Atlantic BBS, 1966-2012:	-2.79%
Eastern BBS, 2002-2012:	-1.11%	New England/Mid-Atlantic BBS, 2002-2012:	-2.39%

Colonization of North America by the European starling began on March 6, 1890 when a member of the Acclimatization Society released 80 starlings into Central Park in New York. The released starlings were able to exploit the habitat resources in the area and were able to become established in the area. In just 50 years, the starling had colonized the United States and expanded into Canada and Mexico and 80 years after the initial introduction had become one of the most common birds in North America (Feare 1984). Today, starlings can be found throughout the state and are considered common permanent residents.

Precise counts of starling populations do not exist but one estimate placed the nationwide starling population at an estimated 140 million birds (Johnson and Glahn 1994). According to Linz et al. (2007), European starlings are prolific with nest success rates estimated between 48% and 79% (Kessel 1957, Royall 1966), although only about 20% of nestlings survive to reproduce (Kessel 1957). Adult survival is believed to be

significantly higher, around 60% (Flux and Flux 1981). Based on these mortality estimates, approximately 80% of the young of the year and 40% of adult starlings die each year due to natural and human causes.

Starlings are not native to Connecticut and are afforded no protection under the MBTA or any state law. Therefore, a depredation permit from the USFWS or the state is not required to remove starlings to alleviate damage or threats of damage. Since the take of starlings to alleviate damage or threats of damage is not reported to the USFWS or the CTDEEP, the lethal take of starlings to alleviate damage or threats of damage by entities other than WS is unknown.

From FY 2010 to FY 2014, WS has dispersed 2,928,572 starlings, employed lethal methods to remove 67,713 starlings, and destroyed 13 starling nests containing 17 eggs. In anticipation of receiving requests for assistance to manage damage and threats associated with a large starling roost, take of up to 30,000 starlings could occur. The take of 30,000 starlings would represent 37.5% of the estimated 80,000 starlings breeding in the state. However, most requests to address large roosts occur during the migration periods and during the winter when the population likely increases above the 80,000 starlings estimated to nest in the state. The increase in the population would be a result of the arrival of migrants and the presence of juveniles in the population.

Table 4 – Number of European Starlings addressed in Connecticut from FY 2010 to FY 2014

Year	Dispersed by WS[1]	WS' Take[1]	WS' Nests Destroyed
2010	1,858,970	25,061	13
2011	699,833	20,371	0
2012	171,771	19,261	0
2013	144,720	2,913	0
2014	53,278	107	0
AVERAGE	**585,714.4**	**13,542.6**	**2.6**

Direct, Indirect, and Cumulative Effects:
WS' proposed starling damage management activities would be conducted pursuant to Executive Order 13112. The Executive Order states that each federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law; 1) reduce invasion of exotic species and associated damages, 2) monitor invasive species populations, provide for restoration of native species and habitats, 3) conduct research on invasive species and develop technologies to prevent introduction, and 4) provide for environmentally sound control and promote public education on invasive species. WS' proposed removal is of a low magnitude compared with the statewide population and therefore will have no adverse direct or indirect effects on starling populations. Although non-WS removal is unknown, WS does not anticipate any significant adverse cumulative impacts on starling populations.

House Sparrow Biology and Population Impact Analysis

CT population estimate:	130,000*	IUCN Status:	Least Concern
CT CBC Trend 1966-2013:	Decreasing	WS proposed take:	200
CT BBS, 1966-2012:	-1.41%	WS proposed nests with eggs:	100
CT BBS, 2002-2012:	-1.49%	WS take as % of state breeding population:	0.15%
Eastern BBS, 1966-2012:	-3.87%	New England/Mid-Atlantic BBS, 1966-2012:	-2.34%
Eastern BBS, 2002-2012:	-4.02%	New England/Mid-Atlantic BBS, 2002-2012:	-2.34%

House sparrows were introduced to North America from England in 1850. From that introduction, sparrows have spread throughout the continent (Fitzwater 1994). House sparrows are found in nearly every habitat except dense forest, alpine, and desert environments. They prefer human-altered habitats, and are abundant on farms and in cities and suburbs (Robbins 1973). House sparrows are not considered migratory in North America and are considered year-round residents wherever they occur, including those sparrows found in

Connecticut (Lowther and Cink 2006). Nesting locations often occur in areas of human activities and are considered "*...fairly gregarious at all times of year*" with nesting occurring in small colonies or in a clumped distribution (Lowther and Cink 2006). Large flocks of sparrows can also be found in the winter as birds forage and roost together.

Robbins (1973) suggested that declines in the sparrow population must be largely attributed to changes in farming practices, which resulted in cleaner operations. One aspect of changing farming practices which might have been a factor would be the considerable decline in small farms and associated disappearance of a multitude of small feed lots, stables and barns, a primary source of food for these birds in the early part of the 20th century. Ehrlich et al. (1988) suggested that house sparrow population declines might be linked to the dramatic decrease during the 20th century in the presence of horses as transport animals. Grain rich horse droppings were apparently a major food source for this species.

House sparrows are non-indigenous and often have negative effects on native birds, primarily through competition for nesting sites. Therefore, sparrows are considered by many wildlife biologists and ornithologists to be an undesirable component of North American wild and native ecosystems. Any reduction in house sparrow populations in North America, even to the extent of complete eradication, could be considered as providing some benefit to native bird species. House sparrows are afforded no protection from take under the MBTA or state laws.

Between FY 2010 and FY 2014, WS has employed non-lethal methods to disperse 122 sparrows, lethal methods to remove 62 house sparrows. In addition, 37 nests containing 49 eggs were removed and destroyed. Since house sparrows are afforded no protection from take under the MBTA, no depredation permits are issued for the take of house sparrows and there are no requirements to report take of sparrows. Therefore, the number of sparrows lethally removed by other entities in the state is unknown.

Table 5 – Number of House Sparrows addressed in Connecticut from FY 2010 to FY 2014

Year	Dispersed by WS[1]	WS' Take[1]	WS' Nests Destroyed
2010	59	45	37
2011	63	4	0
2012	0	0	0
2013	0	12	0
2014	0	1	0
AVERAGE	**24.4**	**12.4**	**7.4**

Direct, Indirect, and Cumulative Effects:

WS' proposed house sparrow damage management activities would be conducted pursuant to Executive Order 13112. The Executive Order states that each federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law; 1) reduce invasion of exotic species and associated damages, 2) monitor invasive species populations, provide for restoration of native species and habitats, 3) conduct research on invasive species and develop technologies to prevent introduction, and 4) provide for environmentally sound control and promote public education on invasive species. WS' proposed removal is of a low magnitude compared with the statewide population and therefore will have no adverse direct or indirect effects on house sparrow populations. Although non-WS removal is unknown, WS does not anticipate any significant adverse cumulative impacts on house sparrow populations.

Summary

Evaluation of WS' activities relative to wildlife populations indicated that program activities will likely have no cumulative adverse effects on populations in West Virginia. WS' actions would be occurring simultaneously, over time, with other natural processes and human-generated changes that are currently taking place. Those activities include, but are not limited to:

- Natural mortality of wildlife
- Human-induced mortality through private damage management activities
- Human and naturally induced alterations of wildlife habitat
- Annual and perennial cycles in population densities

All those factors play a role in the dynamics of wildlife populations. In many circumstances, requests for assistance arise when some or all of those elements have contrived to elevate target species populations or place target species at a juncture to cause damage to resources. WS' actions to minimize or eliminate damage are constrained as to scope, duration and intensity, for the purpose of minimizing or avoiding impacts to the environment. WS evaluates damage occurring, including other affected elements and the dynamics of the damaging species; determines appropriate strategies to minimize effects on environmental elements; applies damage management actions; and subsequently monitors and adjusts/ceases damage management actions (Slate et al. 1992). This process allows WS to take into consideration other influences in the environment, such as those listed above, in order to avoid cumulative adverse impacts on target species.

Issue 2 – Effects on Non-target Wildlife Species Populations, Including T&E Species

The issue of non-target species effects, including effects on threatened and endangered (T&E) species, arises from the use of non-lethal and lethal methods identified in the alternatives. The use of non-lethal and lethal methods has the potential to inadvertently disperse, capture, or kill non-target wildlife. WS' SOPs are designed to reduce the effects of damage management activities on non-target species' populations which were discussed in the EA (USDA 2013). To reduce the risks of adverse effects to non-target wildlife, WS selects damage management methods that are as target-selective as possible or applies such methods in ways that reduces the likelihood of capturing non-target species. Before initiating management activities, WS also selects locations which are extensively used by the target species and employs baits or lures which are preferred by those species. Despite WS' best efforts to minimize non-target take during program activities, the potential for adverse effects to non-targets exists when applying both non-lethal and lethal methods to manage damage or reduce threats to safety.

Non-lethal methods have the potential to cause adverse effects on non-targets primarily through exclusion, harassment, and dispersal. Any exclusionary device erected to prevent access of target species also potentially excludes species that are not the primary reason the exclusion was erected. Therefore, non-target species excluded from areas may potentially be adversely impacted if the area excluded is large enough. The use of auditory and visual dispersal methods used to reduce damage or threats caused by target species are also likely to disperse non-targets in the immediate area where the methods are employed. However, the potential impacts on non-target species are expected to be temporary with target and non-target species often returning after the cessation of dispersal methods.

While every precaution is taken to safeguard against taking non-targets during operational use of methods and techniques for resolving damage and reducing threats caused by wildlife, the use of such methods can result in the incidental take of unintended species. Those occurrences are minimal and should not affect the overall populations of any species. No non-target species were killed or live captured during bird damage management activities since the Decision and FONSI were signed for the EA (USDA 2013).

The EA concluded that effects of control methods on non-target species is biologically insignificant to nonexistent and that WS has not adversely affected the viability of any wildlife species populations through bird damage management activities. Bird damage management activities implemented by WS utilize the most selective and appropriate methods for taking targeted bird species and excluding non-target species. The lethal take of non-targets from using those methods described in the EA is likely to remain low with take never reaching a magnitude that a negative impact on populations would occur.

Threatened and Endangered Species

A review of T&E species listed by the USFWS, the National Marine Fisheries Service, and the CTDEEP showed that the listing of the rufa red knot (*Calidris canutus rufa*) and the long-eared bat (*Myotis septentrionalis*) has occurred since the completion of the EA in 2013. WS would continue to monitor both the federal and state lists of T&E species and would consult with the USFWS and the CTDEEP to ensure future activities to manage bird damage and threats to human health and safety have no effect on newly listed species.

WS' program activities in Connecticut to manage damage and threats caused by birds have not changed from those described in the EA. A review of those species listed in Connecticut and discussed in the EA indicates that WS' bird damage management activities would continue to have no adverse effects on those species. Program activities and their potential impacts on other wildlife species, including T&E species have not changed from those analyzed in the EA. Impacts of the program on this issue are expected to remain insignificant.

Issue 3 – Effects of Damage Management Methods on Human Health and Safety

Since the completion of the EA and the Decision and FONSI in 2013, no injuries to employees or the public occurred from the implementation of methods under the proposed action. Based on the analyses in the EA, when WS' activities are conducted according to WS' directives, SOPs, and in accordance with federal, state, and local laws those activities pose minimal risks to human safety (USDA 2013). Program activities and their potential impacts on human health and safety have not changed from those analyzed in the EA. No additional methods or techniques are being proposed for use under the proposed action. Impacts of the program on this issue are expected to remain insignificant.

Issue 4 – Effects on Aesthetic Values of Birds

As described in the EA, WS employs methods when requested that would result in the dispersal, exclusion, or removal of individuals or small groups of birds to resolve damage to agriculture, property, natural resources, or threats to human health and safety. In some instances where birds are excluded, dispersed, or removed, the ability of interested persons to observe and enjoy those birds will likely temporarily decline. Even the use of non-lethal methods can lead to dispersal of birds if the resource being protected was acting as an attractant. Thus, once the attractant has been removed or made unattractive, birds will likely disperse to other areas where resources are more available.

The use of lethal methods would result in a temporary reduction in local populations resulting from the removal of target birds to resolve requests for assistance. WS' goal is to respond to requests for assistance and to manage those birds responsible for the resulting damage. Therefore, the ability to view and enjoy those birds will still remain if a reasonable effort is made to view those species outside the area in which damage management activities occurred.

The EA concluded the effects on aesthetics would be variable depending on the stakeholders' values towards wildlife. Program activities and potential impacts on human affectionate bonds with birds and aesthetics have not changed from those analyzed in the EA.

Issue 5 – Humaneness and Animal Welfare Concerns of Methods

As discussed in the EA, humaneness, in part, appears to be a person's perception of harm or pain inflicted on an animal. People may perceive the humaneness of an action differently. The challenge in coping with this issue is how to achieve the least amount of animal suffering within the constraints imposed by current technology and funding.

Some individuals believe any use of lethal methods to resolve damage associated with wildlife is inhumane

because the resulting fate is the death of the animal. Others believe that certain lethal methods can lead to a humane death. Others believe most non-lethal methods of capturing wildlife to be humane because the animal is generally unharmed and alive. Still others believe that any disruption in the behavior of wildlife is inhumane. With the varied attitudes on the meaning of humaneness, the analyses must consider the most effective way to address damage and threats caused by wildlife in a humane manner. WS is challenged with conducting activities and employing methods that are perceived to be humane while assisting those persons requesting assistance to manage damage and threats associated with wildlife. The goal of WS is to use methods as humanely as possible to effectively resolve requests for assistance to reduce damage and threats to human safety. WS continues to evaluate methods and activities to minimize the potential pain and suffering of wildlife when attempting to resolve requests for assistance.

WS' mission is to effectively address requests for assistance using methods in the most humane way possible that minimizes the stress and pain of the animal. WS' personnel are experienced and professional in their use of management methods, and methods are applied as humanely as possible. Methods used in wildlife damage management activities since the completion of the EA and their potential impacts on humaneness and animal welfare have not changed from those analyzed in the EA. Therefore, the analyses of the humaneness of methods used by WS during activities to protect native birds have not changed from those analyzed in the EA.

Issue 6 - Effects of Bird Damage Management Activities on the Regulated Harvest of Birds

The magnitude of WS' bird take for damage management purposes from FY 2013 and FY 2014 was low when compared to the total take of birds and when compared to the estimated statewide populations of those species. Since all take of birds is regulated by the USFWS and the CTDEEP, the take of birds by WS that would occur annually and cumulatively would occur pursuant to established bird population objectives. WS' take of birds (combined take) annually to alleviate damage would be a minor component of the known annual take that occurs during the harvest seasons.

With oversight of bird take, the USFWS and the CTDEEP maintains the ability to regulate take by WS to meet management objectives for birds. Therefore, the cumulative take of birds is considered as part of the USFWS and the CTDEEP objectives for bird populations.

Issue 7 - Effectiveness of Bird Damage Management Methods

A major concern of wildlife damage management is the effectiveness of any damage management program and whether the proposed action or any of the alternatives would reduce such damage to more acceptable levels. This effectiveness could be defined in terms of losses or risks potentially reduced or prevented which is based on how accurately the practitioner diagnoses the problem, the species responsible for the damage, and how actions are implemented to correct or mitigate risks or damages. The most effective approach to resolving any damage problem is to use an adaptive integrated approach, which may call for the use of several management methods simultaneously or sequentially (Courchamp et al. 2003).

Effectiveness is based on the types of methods employed, the application of the method, restrictions on the use of the method(s), the skill of the personnel using the method and, for WS' personnel, the guidance provided by WS' Directives and policies. The goal of the WS' program is to reduce damage, risks, and conflicts with wildlife as requested. WS recognizes that localized population reduction could be short-term and that new individuals may immigrate, be released at the site, or be born to animals remaining at the site (Courchamp et al. 2003). The ability of an animal population to sustain a certain level of removal and to eventually return to pre-management levels; however, does not mean individual management actions were unsuccessful, but that periodic management may be necessary.

Correlated with the effectiveness of methods at reducing or alleviating damage or threats would be the costs associated with applying methods to reduce damage or threats. If methods are ineffective at reducing or alleviating damage or if methods require re-application after initially being successful, the costs associated with applying those methods increases. An analysis of cost-effectiveness in many 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 Canada geese from defecating on public use areas 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 damage management are not possible to estimate. In addition, it is rarely possible to prove conclusively birds were responsible for individual disease cases or outbreaks.

As part of an integrated approach to managing bird damage, WS has the ability to adapt methods to damage situations to effectively reduce or prevent damage from occurring. Under integrated approach implemented under the EA, all methods, individually or in combination, were 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 was to reduce damage and threats to human safety or to prevent damage from occurring using an integrated approach to managing bird damage. Therefore, WS employs 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. However, the methods determined to be most effective to reduce damage and threats to human safety caused by birds and that prove to be the most cost effective will receive the greatest application. As part of an integrated approach, evaluation of methods will continually occur to allow for those methods that are most effective at resolving damage or threats to be employed under similar circumstance where birds are causing damage or pose a threat. Additionally, management operations may be constrained by cooperator funding and/or objectives and needs. The cost effectiveness of methods and the effectiveness of methods are linked.

As stated in the EA, WS only provides assistance after a request has been received and a cooperative service agreement or other comparable document has been signed by WS and the requesting entity in which all methods used to address birds causing damage are agreed upon. Methods employed to manage bird 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.

WS' objective is to respond to requests 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 bird damage that is agreed upon by the cooperator.

Summary

No significant cumulative environmental impacts are expected from activities considered under the Supplement. Likewise, no significant cumulative impacts have been identified from the implementation of the proposed action in the EA since 2013. Under the proposed action, the reduction of wildlife damage or threats using an integrated approach employing both non-lethal and lethal methods would not have significant impacts on wildlife populations in Connecticut or nationwide. WS continues to coordinate activities with federal, state, and local entities to ensure activities do not adversely impact wildlife populations. No risk to public safety is expected when WS' activities are conducted pursuant to the proposed action or the proposed supplement to the EA. The EA further describes and addresses cumulative impacts from the alternatives, including the proposed action.

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APPENDIX A

Connecticut List of Federally and State Listed Endangered, Threatened & Special Concern Species

State	Federal	Common Name	Scientific Name
		Mammals	
SC	E	Gray wolf*	*Canis lupus*
E		Least shrew	*Cryptotis parva*
SC		Silver-haired bat	*Lasionycteris noctivagans*
SC		Red bat	*Lasiurus borealis*
SC		Hoary bat	*Lasiurus cinereus*
SC		Eastern small-footed bat*	*Myotis leibii*
	T	Northern long-eared bat	*Myotis septentrionalis*
E	E	Indiana bat	*Myotis sodalis*
SC		Eastern wood rat*	*Neotoma magister*
SC		Harbor porpoise	*Phocoena phocoena*
SC	E	Eastern cougar*	*Puma concolor couguar*
SC		Southern bog lemming	*Synaptomys cooperi*
	E	Finback whale	*Balaenoptera physalus*
	E	Northern Atlantic right whale	*Eubalaena glacialis*
		Birds	
E		Sharp-shinned hawk	*Accipiter striatus*
SC		Northern saw-whet owl	*Aegolius acadicus*
SC		Saltmarsh sharp-tailed sparrow	*Ammodramus caudacutus*
SC		Henslow's sparrow*	*Ammodramus henslowii*
T		Seaside sparrow	*Ammodramus maritimus*
E		Grasshopper sparrow	*Ammodramus savannarum*
T		Blue-winged teal (nesting population only)	*Anas discors*
T		Great egret	*Ardea alba*
T		Short-eared owl (wintering populations)	*Asio flammeus*
E		Long-eared owl	*Asio otus*
E		Upland sandpiper	*Bartramia longicauda*

State	Federal	Common Name	Scientific Name
E		American bittern	*Botaurus lentiginosus*
SC		Broad-winged hawk	*Buteo platypterus*
	T	Rufa Red Knot	*Calidris canutus rufa*
SC		Whip-poor-will	*Caprimulgus vociferus*
T	T	Piping plover	*Charadrius melodus*
E		Common nighthawk	*Chordeiles minor*
E		Northern harrier	*Circus cyaneus*
E		Sedge wren	*Cistothorus platensis*
SC		Bobolink	*Dolichonyx oryzivorus*
SC		Little blue heron	*Egretta caerulea*
T		Snowy egret	*Egretta thula*
SC		Alder flycatcher	*Empidonax alnorum*
E		Horned lark	*Eremophila alpestris*
T		Peregrine falcon	*Falco peregrinus*
T		American kestrel	*Falco sparverius*
E		Common moorhen	*Gallinula chloropus*
SC		Common loon	*Gavia immer*
T		American oystercatcher	*Haematopus palliatus*
T		Bald eagle	*Haliaeetus leucocephalus*
E		Yellow-breasted chat	*Icteria virens*
T		Least bittern	*Ixobrychus exilis*
E		Black rail (nesting population only)	*Laterallus jamaicensis*
E		Red-headed woodpecker	*Melanerpes erythrocephalus*
SC	E	Eskimo curlew*	*Numenius borealis*
SC		Yellow-crowned night-heron	*Nyctanassa violacea*
SC		Northern parula	*Parula americana*
SC		Savannah sparrow	*Passerculus sandwichensis*
SC		Ipswich sparrow (wintering populations)	*Passerculus sandwichensis ssp. princeps*
SC		Glossy ibis	*Plegadis falcinellus*

State	Federal	Common Name	Scientific Name
E		Pied-billed grebe	*Podilymbus podiceps*
E		Vesper sparrow	*Pooecetes gramineus*
T		Purple martin	*Progne subis*
E		King rail (nesting population only)	*Rallus elegans*
E	E	Roseate tern	*Sterna dougallii*
SC		Common tern	*Sterna hirundo*
T		Least tern	*Sternula antillarum*
SC		Eastern meadowlark	*Sturnella magna*
SC		Brown thrasher	*Toxostoma rufum*
E		Barn owl	*Tyto alba*
E		Golden-winged warbler	*Vermivora chrysoptera*
Reptiles			
T		Loggerhead sea turtle	*Caretta caretta*
T	T	Atlantic green sea turtle	*Chelonia mydas*
E		Timber rattlesnake	*Crotalus horridus*
E	E	Leatherback	*Dermochelys coriacea*
	E	Hawksbill sea turtle	*Eretmochelys imbircata*
T		Five-lined skink	*Eumeces fasciatus*
SC		Wood turtle	*Glyptemys insculpta*
E	T	Bog turtle	*Glyptemys muhlenbergii*
SC		Eastern hognose snake	*Heterodon platirhinos*
E	E	Atlantic/Kemps ridley sea turtle	*Lepidochelys kempii*
SC		Smooth green snake	*Liochlorophis vernalis*
SC		Eastern box turtle	*Terrapene carolina carolina*
SC		Eastern ribbon snake	*Thamnophis sauritus*
Amphibians			
SC		Jefferson salamander "complex"	*Ambystoma jeffersonianum*
E		Blue-spotted salamander (diploid populations)	*Ambystoma laterale*
SC		Blue-spotted salamander "complex"	*Ambystoma laterale*

State	Federal	Common Name	Scientific Name
T		Northern spring salamander	*Gyrinophilus porphyriticus*
T		Northern slimy salamander	*Plethodon glutinosus*
SC		Northern leopard frog	*Rana pipiens*
E		Eastern spadefoot	*Scaphiopus holbrookii*
Fish			
E	E	Shortnose sturgeon	*Acipenser brevirostrum*
T		Atlantic sturgeon	*Acipenser oxyrinchus oxyrinchus*
SC		Blueback herring	*Alosa aestivalis*
SC		Longnose sucker	*Catostomus catostomus*
SC		Banded sunfish	*Enneacanthus obesus*
E		American brook lamprey	*Lampetra appendix*
E		Burbot	*Lota lota*
SC		Bridle shiner	*Notropis bifrenatus*
E		Rainbow smelt (anadromous populations only)	*Osmerus mordax*
Insects			
T		Coastal heathland cutworm	*Abagrotis nefascia benjamini*
SC		Barrens dagger moth*	*Acronicta albarufa*
SC		Noctuid moth*	*Acronicta lanceolaria*
SC		Ground beetle	*Agonum darlingtoni*
SC		Ground beetle	*Agonum mutatum*
SC		Spotted dart moth	*Agrotis stigmosa*
SC		Ground beetle	*Amara chalcea*
E		Common roadside skipper	*Amblyscirtes vialis*
E		Noctuid moth	*Anarta luteola*
SC		Tusked sprawler	*Anthopotamus verticis*
SC		Apamea moth	*Apamea burgessi*
SC		Apamea moth	*Apamea inordinata*
SC		Apamea moth	*Apamea lintneri*
T		New Jersey tea inchworm	*Apodrepanulatrix liberaria*

State	Federal	Common Name	Scientific Name
SC		Short-lined chocolate	*Argyrostrotis anilis*
SC		Tabanid fly	*Atylotus ohioensis*
SC		Ground beetle	*Badister transversus*
SC		Ground beetle	*Bembidion carinula*
SC		Ground beetle	*Bembidion lacunarium*
SC		Ground beetle	*Bembidion planum*
SC		Ground beetle	*Bembidion pseudocautum*
SC		Ground beetle	*Bembidion quadratulum*
SC		Ground beetle	*Bembidion semicinctum*
SC		Ground beetle	*Bembidion simplex*
SC		Affable bumblebee	*Bombus affinis*
SC		Ashton's bumblebee*	*Bombus ashtoni*
SC		Yellowbanded bumblebee	*Bombus terricola*
SC		Bombardier beetle	*Brachinus cyanipennis*
SC		Bombardier beetle	*Brachinus fumans*
SC		Bombardier beetle	*Brachinus medius*
SC		Bombardier beetle	*Brachinus ovipennis*
SC		Bombardier beetle	*Brachinus patruelis*
E		Northern metalmark	*Calephelis borealis*
SC		Henry's elfin	*Callophrys henrici*
E		Hessel's hairstreak	*Callophrys hesseli*
T		Frosted elfin	*Callophrys irus*
SC		Hoary elfin*	*Callophrys polios*
T		Sparkling jewelwing	*Calopteryx dimidiata*
SC		Ground beetle*	*Calosoma wilcoxi*
SC		Ground beetle*	*Carabus serratus*
SC		Ground beetle*	*Carabus sylvosus*
SC		Ground beetle	*Carabus vinctus*
E		Herodias underwing	*Catocala herodias gerhardi*

State	Federal	Common Name	Scientific Name
SC		Precious underwing moth*	*Catocala pretiosa pretiosa*
T		Appalachian blue	*Celastrina neglectamajor*
SC		Noctuid moth	*Chaetaglaea cerata*
SC		Harris' checkerspot*	*Chlosyne harrisii*
SC		Silvery checkerspot*	*Chlosyne nycteis*
SC	T	Northeastern beach tiger beetle*	*Cicindela dorsalis dorsalis*
SC		Pine barrens tiger beetle	*Cicindela formosa generosa*
SC		Tiger beetle	*Cicindela hirticollis*
E		Dune ghost tiger beetle	*Cicindela lepida*
SC		Tiger beetle	*Cicindela marginata*
E	E	Puritan tiger beetle	*Cicindela puritana*
SC		Tiger beetle*	*Cicindela purpurea*
SC		Dark-bellied tiger beetle	*Cicindela tranquebarica*
SC		Regal moth*	*Citheronia regalis*
SC		C9 Lady beetle*	*Coccinella novemnotata*
T		Tiger spiketail	*Cordulegaster erronea*
SC		Noctuid moth*	*Cucullia speyeri*
T		False heather underwing	*Drasteria graphica atlantica*
SC		Imperial moth*	*Eacles imperialis imperialis*
T		Atlantic bluet	*Enallagma doubledayi*
SC		Little bluet	*Enallagma minusculum*
SC		Scarlet bluet	*Enallagma pictum*
E		Macropis cuckoo	*Epeoloides pilosula*
T		Sleepy duskywing	*Erynnis brizo*
SC		Horace's duskywing	*Erynnis horatius*
E		Columbine duskywing	*Erynnis lucilius*
SC		Mottled duskywing*	*Erynnis martialis*
E		Persius duskywing	*Erynnis persius persius*
SC		Scrub euchlaena	*Euchlaena madusaria*

State	Federal	Common Name	Scientific Name
SC		Noctuid moth	*Eucoptocnemis fimbriaris*
T		Morrison's mosaic	*Eucosma morrisoni*
SC		Brown-bordered geometer	*Eumacaria latiferrugata*
T		Two-spotted skipper	*Euphyes bimacula*
SC		Sedge skipper	*Euphyes dion*
SC		Noctuid moth	*Euxoa pleuritica*
T		Violet dart moth	*Euxoa violaris*
SC		Pitcher plant moth	*Exyra fax*
T		Pink streak	*Faronta rubripennis*
SC		Ground beetle	*Geopinus incrassatus*
T		Mustached clubtail	*Gomphus adelphus*
T		Harpoon clubtail	*Gomphus descriptus*
T		Midland clubtail	*Gomphus fraternus*
T		Rapids clubtail	*Gomphus quadricolor*
SC		Cobra clubtail	*Gomphus vastus*
SC		Skillet clubtail	*Gomphus ventricosus*
SC		Horse fly	*Goniops chrysocoma*
E		Phyllira tiger moth	*Grammia phyllira*
E		Bog tiger moth	*Grammia speciosa*
SC		Ground beetle	*Harpalus caliginosus*
SC		Ground beetle	*Harpalus eraticus*
SC		Ground beetle	*Helluomorphoides praeustus bicolor*
T		Slender clearwing	*Hemaris gracilis*
E		Buck moth	*Hemileuca maia maia*
T		American rubyspot	*Hetaerina americana*
T		Horse fly	*Hybomitra frosti*
E		Horse fly	*Hybomitra longiglossa*
SC		Horse fly	*Hybomitra luridus*
SC		Horse fly	*Hybomitra trepida*

State	Federal	Common Name	Scientific Name
SC		Horse fly	*Hybomitra typhus*
SC		Hop vine borer moth*	*Hydraecia immanis*
SC		Blue corporal dragonfly	*Ladona deplanata*
SC		Noctuid moth	*Lepipolys perscripta*
T		Crimson-ringed whiteface	*Leucorrhinia glacialis*
SC		Lemmer's noctuid moth*	*Lithophane lemmeri*
SC		Pale green pinion moth*	*Lithophane viridipallens*
SC		Yellow-horned beaded lacewing	*Lomamyia flavicornis*
SC		Black lordithon rove beetle*	*Lordithon niger*
SC		Ground beetle	*Loxandrus vulneratus*
SC		Bog copper	*Lycaena epixanthe*
SC		Bronze copper	*Lycaena hyllus*
SC		Fringed loosestrife oil-bee	*Macropis ciliata*
SC		Eastern cactus-boring moth	*Melitara prodenialis*
SC		Newman's brocade	*Meropleon ambifuscum*
SC		Tabanid fly	*Merycomyia whitneyi*
E		Barrens metarranthis moth	*Metarranthis apiciaria*
SC		Syrphid fly*	*Mixogaster johnsoni*
SC		Ground beetle	*Nebria lacustris lacustris*
SC	E	American burying beetle*	*Nicrophorus americanus*
SC		Ground beetle*	*Omophron tesselatum*
SC		Dune oncocnemis	*Oncocnemis riparia*
SC		Ground beetle*	*Panagaeus fasciatus*
E		Pitcher plant borer	*Papaipema appassionata*
SC		Hops-stalk borer moth*	*Papaipema circumlucens*
SC		Seaside goldenrod stem borer	*Papaipema duovata*
T		Columbine borer	*Papaipema leucostigma*
SC		Maritime sunflower borer moth*	*Papaipema maritima*
SC		Culvers root bore moth*	*Papaipema sciata*

State	Federal	Common Name	Scientific Name
SC		Mayfly	*Paraleptophlebia assimilis*
T		Lanced phaneta	*Phaneta clavana*
E		Labrador tea tentiform leafminer	*Phyllonorycter ledella*
SC		Gray comma*	*Polygonia progne*
T		Common sanddragon	*Progomphus obscurus*
T		Pink sallow	*Psectraglaea carnosa*
SC		Annointed sallow moth*	*Pyreferra ceromatica*
SC		Aureolaria seed borer	*Rhodoecia aurantiago*
SC		Soldier fly	*Sargus fasciatus*
SC		Eyed brown	*Satyrodes eurydice*
SC		Ground beetle*	*Scaphinotus elevatus*
SC		Ground beetle	*Scaphinotus viduus*
SC		Noctuid moth	*Schinia spinosae*
SC		Ski-tailed emerald	*Somatochlora elongata*
SC		Spartina borer moth	*Spartiniphaga inops*
T		Barrens itame	*Speranza exornata*
T		Atlantis fritillary butterfly	*Speyeria atlantis*
SC		Regal fritillary*	*Speyeria idalia*
SC		Tabanid fly	*Stonemyia isabellina*
T		Riverine clubtail	*Stylurus amnicola*
SC		Horse fly	*Tabanus fulvicallus*
SC		Ground beetle	*Tetragonoderus fasciatus*
T		Grassland thaumatopsis	*Thaumatopsis edonis*
SC		Cicada	*Tibicen auletes*
E		Banded bog skimmer	*Williamsonia lintneri*
T		Noctuid moth	*Zale curema*
SC		Noctuid moth	*Zale obliqua*
T		Noctuid moth	*Zale submediana*
T		Noctuid moth	*Zanclognatha martha*

State	Federal	Common Name	Scientific Name
Other Invertebrates			
E	E	Dwarf wedge mussel	*Alasmidonta heterodon*
E		Brook floater	*Alasmidonta varicosa*
SC		Mystic valley amphipod	*Crangonyx aberrans*
E		Fairy shrimp	*Eubranchipus holmanii*
SC		Clam shrimp*	*Eulimnadia agassizii*
SC		Lymnaeid snail*	*Fossaria galbana*
SC		Lymnaeid snail	*Fossaria rustica*
SC		Aquatic snail	*Gyraulus circumstriatus*
E		Yellow lamp mussel	*Lampsilis cariosa*
SC		Tidewater mucket	*Leptodea ochracea*
SC		Eastern pond mussel	*Ligumia nasuta*
SC		Eastern pearl shell	*Margaritifera margaritifera*
SC		Slender walker	*Pomatiopsis lapidaria*
SC		Whiteriver crayfish	*Procambarus acutus*
SC		Purse web spider	*Sphodros niger*
SC		Lymnaeid snail	*Stagnicola catascopium*
SC		Piedmont groundwater amphipod	*Stygobromus tenuis tenuis*
SC		Coastal pond amphipod	*Synurella chamberlaini*
SC		Boreal turret snail	*Valvata sincera*
SC		Turret snail	*Valvata tricarinata*
Plants			
E		Balsam fir (native populations only)	*Abies balsamea*
SC		Virginia copperleaf	*Acalypha virginica*
E	E	Sandplain gerardia	*Agalinis acuta*
E		Yellow giant hyssop	*Agastache nepetoides*
E		Purple giant hyssop	*Agastache scrophulariifolia*
E		Small white snakeroot	*Ageratina aromatica*
T		Orange foxtail	*Alopecurus aequalis*

State	Federal	Common Name	Scientific Name
SC	T	Sea-beach amaranth*	*Amaranthus pumilus*
T		Bog rosemary	*Andromeda polifolia var. glaucophylla*
T		Canada anemone	*Anemone canadensis*
E		Sea-coast angelica	*Angelica lucida*
SC		Hairy angelica*	*Angelica venenosa*
SC		Field pussytoes*	*Antennaria howellii ssp. petaloidea*
SC		Puttyroot*	*Aplectrum hyemale*
E		Dwarf mistletoe	*Arceuthobium pusillum*
SC		Arethusa*	*Arethusa bulbosa*
SC		Needlegrass	*Aristida longespica*
SC		Arrowfeather	*Aristida purpurascens*
E		Beach needle grass	*Aristida tuberculosa*
SC		Virginia snakeroot	*Aristolochia serpentaria*
SC		Purple milkweed	*Asclepias purpurascens*
SC		White milkweed*	*Asclepias variegata*
E		Green milkweed	*Asclepias viridiflora*
SC		Mountain spleenwort	*Asplenium montanum*
T		Wallrue spleenwort	*Asplenium ruta-muraria*
SC		Orache	*Atriplex glabriuscula*
SC		Swamp birch	*Betula pumila*
T		Water-marigold	*Bidens beckii*
T		Eaton's beggars-tick	*Bidens eatonii*
SC		Downy wood-mint*	*Blephilia ciliata*
SC		Hairy woodmint*	*Blephilia hirsuta*
SC		Bayonet grass	*Bolboschoenus maritimus ssp. paludosus*
SC		Salt marsh bulrush	*Bolboschoenus novae-angliae*
SC		Little grape fern*	*Botrychium simplex*
E		Side-oats grama-grass	*Bouteloua curtipendula*
SC		Reed bentgrass	*Calamagrostis stricta ssp. inexpansa*

State	Federal	Common Name	Scientific Name
SC		Low bindweed*	*Calystegia spithamaea*
SC		Purple cress	*Cardamine douglassii*
SC		Summer sedge	*Carex aestivalis*
E		Broadwing sedge	*Carex alata*
T		Foxtail sedge	*Carex alopecoidea*
SC		Sedge	*Carex aquatilis var. aquatilis*
E		Sedge	*Carex backii*
E		Barratt's sedge	*Carex barrattii*
SC		Sedge	*Carex bushii*
E		Brown bog sedge	*Carex buxbaumii*
E		Chestnut-colored sedge	*Carex castanea*
SC		Collins sedge*	*Carex collinsii*
T		Crawe's sedge	*Carex crawei*
SC		Crawford sedge*	*Carex crawfordii*
T		Clustered sedge	*Carex cumulata*
T		Davis' sedge	*Carex davisii*
E		Sedge	*Carex exilis*
SC		Bronze sedge*	*Carex foenea*
SC		Handsome sedge	*Carex formosa*
SC		Hitchcock's sedge	*Carex hitchcockiana*
T		Sedge	*Carex limosa*
E		Sedge	*Carex magellanica*
SC		Troublesome sedge	*Carex molesta*
SC		Black-edge sedge*	*Carex nigromarginata*
SC		New England sedge	*Carex novae-angliae*
SC		Eastern few-fruited sedge	*Carex oligocarpa*
SC		Few-seeded sedge*	*Carex oligosperma*
SC		Few-flowered sedge*	*Carex pauciflora*
E		Variable sedge	*Carex polymorpha*

State	Federal	Common Name	Scientific Name
SC		Prairie sedge	*Carex prairea*
E		Cyprus-like sedge	*Carex pseudocyperus*
E		Schweinitz's sedge	*Carex schweinitzii*
SC		Sedge	*Carex squarrosa*
SC		Dioecious sedge	*Carex sterilis*
SC		Sedge	*Carex trichocarpa*
SC		Tuckerman's sedge	*Carex tuckermanii*
SC		Sedge	*Carex typhina*
E		Little green sedge	*Carex viridula*
E		Willdenow's sedge	*Carex willdenowii*
T		Indian paintbrush	*Castilleja coccinea*
SC		Eastern redbud (native populations only)*	*Cercis canadensis*
E		Devil's-bit	*Chamaelirium luteum*
E		Hairy lip-fern	*Cheilanthes lanosa*
SC		Coast blite*	*Chenopodium rubrum*
E		Yellow thistle	*Cirsium horridulum*
E		Long-bracted green orchid	*Coeloglossum viride*
SC		Early coral root	*Corallorhiza trifida*
T		Yellow corydalis	*Corydalis flavula*
E		Pygmyweed	*Crassula aquatica*
SC		Elliptical rushfoil*	*Croton willdenowii*
E		Slender cliff-brake	*Cryptogramma stelleri*
SC		Blue waxweed*	*Cuphea viscosissima*
SC		Hazel dodder*	*Cuscuta coryli*
SC		Wild comfrey*	*Cynoglossum virginianum*
SC		Ram's-head lady's-slipper*	*Cypripedium arietinum*
SC		Yellow lady's-slipper	*Cypripedium parviflorum*
E		Showy lady's-slipper	*Cypripedium reginae*

State	Federal	Common Name	Scientific Name
E		Dew-drop	*Dalibarda repens*
SC		Tufted hairgrass	*Deschampsia caespitosa*
E		Large-bracted tick-trefoil	*Desmodium cuspidatum*
SC		Dillenius' tick-trefoil	*Desmodium glabellum*
E		Trailing tick-trefoil	*Desmodium humifusum*
SC		Sessile-leaf tick-trefoil*	*Desmodium sessilifolium*
SC		Squirrel corn	*Dicentra canadensis*
SC		Panic grass	*Dichanthelium ovale var. addisonii*
E		Panic grass	*Dichanthelium scabriusculum*
SC		Panic grass*	*Dichanthelium sphaerocarpon var. isophyllum*
SC		Panic grass*	*Dichanthelium xanthophysum*
SC		Persimmon	*Diospyros virginiana*
E		Narrow-leaved glade fern	*Diplazium pycnocarpon*
SC		Whitlow-grass	*Draba reptans*
SC		Thread-leaf sundew*	*Drosera filiformis*
E		Mountain wood-fern	*Dryopteris campyloptera*
SC		Goldie's fern	*Dryopteris goldiana*
E		Bur-head	*Echinodorus tenellus*
E		Horse-tail spike-rush	*Eleocharis equisetoides*
SC		Spike-rush*	*Eleocharis microcarpa var. filiculmis*
E		Spike-rush	*Eleocharis quadrangulata var. crassior*
SC		Wiegand's wild rye	*Elymus wiegandii*
SC		Marsh horsetail*	*Equisetum palustre*
E		Meadow horsetail	*Equisetum pratense*
E		Dwarf scouring rush	*Equisetum scirpoides*
E		Parker's pipewort	*Eriocaulon parkeri*
T		Hare's tail	*Eriophorum vaginatum var. spissum*
E		White thoroughwort	*Eupatorium album*

State	Federal	Common Name	Scientific Name
E		Rough aster	*Eurybia radula*
T		Showy aster	*Eurybia spectabilis*
SC		Hervey's aster	*Eurybia X herveyi*
E		False mermaid-weed	*Floerkea proserpinacoides*
E		Bog bedstraw	*Galium labradoricum*
SC		Purple cudweed*	*Gamochaeta purpurea*
SC		Creeping snowberry	*Gaultheria hispidula*
T		Dwarf huckleberry	*Gaylussacia dumosa var. bigeloviana*
E		Stiff gentian	*Gentianella quinquefolia*
SC		Bicknell's northern crane's-bill*	*Geranium bicknellii*
SC		Dwarf rattlesnake plantain*	*Goodyera repens var. ophioides*
E		Sweet-scented Indian-plantain	*Hasteola suaveolens*
SC		Bush rockrose*	*Helianthemum dumosum*
T		Low frostweed	*Helianthemum propinquum*
SC		Sharp-lobed hepatica	*Hepatica nobilis var. acuta*
SC		Kidneyleaf mud-plantain*	*Heteranthera reniformis*
SC		Seabeach sandwort	*Honckenya peploides*
SC		Featherfoil	*Hottonia inflata*
T		Longleaf bluet	*Houstonia longifolia*
E		Golden-heather	*Hudsonia ericoides*
T		False beach-heather	*Hudsonia tomentosa*
SC		Fir clubmoss*	*Huperzia selago*
SC		Green violet*	*Hybanthus concolor*
E		Golden seal	*Hydrastis canadensis*
E		Water pennywort	*Hydrocotyle umbellata*
E		Whorled pennywort	*Hydrocotyle verticillata*
SC		Virginia waterleaf	*Hydrophyllum virginianum*
SC		Creeping St. John's-wort*	*Hypericum adpressum*
SC		Great St. John's-wort	*Hypericum ascyron*

State	Federal	Common Name	Scientific Name
T		Inkberry (native populations only)	*Ilex glabra*
E	T	Small whorled pogonia	*Isotria medeoloides*
SC		Weak rush*	*Juncus debilis*
SC		Two-flowered cynthia	*Krigia biflora*
E		Carolina redroot (native populations only)	*Lachnanthes caroliana*
E		Saltpond grass	*Leptochloa fusca ssp. fascicularis*
SC		Creeping bush-clover	*Lespedeza repens*
SC		Blazing star	*Liatris scariosa var. novae-angliae*
E		Scotch lovage	*Ligusticum scothicum*
SC		Lilaeopsis	*Lilaeopsis chinensis*
SC		Mudwort	*Limosella australis*
E		Twinflower	*Linnaea borealis ssp. americana*
SC		Sandplain flax*	*Linum intercursum*
E		Yellow flax	*Linum sulcatum*
E		Lily-leaved twayblade	*Liparis liliifolia*
T		Dwarf bulrush	*Lipocarpha micrantha*
SC		Sweet gum (native populations only)	*Liquidambar styraciflua*
SC		Many-fruited false-loosestrife*	*Ludwigia polycarpa*
E		Globe-fruited false-loosestrife	*Ludwigia sphaerocarpa*
E		Foxtail clubmoss	*Lycopodiella alopecuroides*
SC		Clasping-leaved water-horehound	*Lycopus amplectens*
SC		Climbing fern	*Lygodium palmatum*
SC		Stagger-bush*	*Lyonia mariana*
E		Winged loosestrife	*Lythrum alatum*
T		Three-leaved false Solomon's-seal	*Maianthemum trifolium*
E		Bayard's white adder's mouth	*Malaxis bayardii*
E		White adder's-mouth	*Malaxis brachypoda*
E		Green adder's-mouth	*Malaxis unifolia*

State	Federal	Common Name	Scientific Name
E		Tall millet-grass	*Milium effusum*
T		Mountain sandwort	*Minuartia glabra*
SC		Naked miterwort	*Mitella nuda*
E		Large-leaved sandwort	*Moehringia macrophylla*
E		One-flower wintergreen	*Moneses uniflora*
E		Red mulberry	*Morus rubra*
E		Long-awn hairgrass	*Muhlenbergia capillaris*
E		Slender water-milfoil	*Myriophyllum alterniflorum*
E		Cutleaf water-milfoil	*Myriophyllum pinnatum*
T		Northern water-milfoil	*Myriophyllum sibiricum*
SC		Large yellow pond lily*	*Nuphar advena*
SC		Small yellow pond lily	*Nuphar microphylla*
E		Bog aster	*Oclemena nemoralis*
E		Blake's aster	*Oclemena X blakei*
SC		Sundrops*	*Oenothera fruticosa*
E		Prairie goldenrod	*Oligoneuron album*
E		Stiff goldenrod	*Oligoneuron rigidum*
E		Gravel-weed	*Onosmodium virginianum*
T		Adder's-tongue	*Ophioglossum pusillum*
SC		Eastern prickly pear	*Opuntia humifusa*
SC		Golden club	*Orontium aquaticum*
SC		One-sided pyrola*	*Orthilia secunda*
SC		Violet wood-sorrel	*Oxalis violacea*
T		Ragwort	*Packera paupercula*
SC		American ginseng	*Panax quinquefolius*
T		Panic grass	*Panicum amarum*
SC		Tall flat panic-grass*	*Panicum rigidulum var. elongatum*
SC		Warty panic grass*	*Panicum verrucosum*
SC		Hairy forked chickweed*	*Paronychia fastigiata*

State	Federal	Common Name	Scientific Name
E		Field paspalum	*Paspalum laeve*
SC		Bead grass*	*Paspalum setaceum*
T		Swamp lousewort	*Pedicularis lanceolata*
E		Smooth cliff-brake	*Pellaea glabella*
T		Sweet coltsfoot	*Petasites frigidus var. palmatus*
SC		Wild kidney bean*	*Phaseolus polystachios var. polystachios*
E		Red pine (native populations only)	*Pinus resinosa*
E		Slender mountain ricegrass	*Piptatherum pungens*
E		Sickle-leaved golden aster	*Pityopsis falcata*
SC		Hoary plantain	*Plantago virginica*
E		White-fringed orchid	*Platanthera blephariglottis*
T		Yellow-fringed orchid	*Platanthera ciliaris*
SC		Tall white bog orchid*	*Platanthera dilatata*
SC		Pale green orchid	*Platanthera flava var. herbiola*
SC		Hooker's orchid*	*Platanthera hookeri*
SC		Large round-leaved orchid*	*Platanthera orbiculata*
SC		Threadfoot	*Podostemum ceratophyllum*
SC		Clammy-weed*	*Polanisia dodecandra*
E		Field milkwort	*Polygala cruciata*
E		Nuttall's milkwort	*Polygala nuttallii*
E		Seneca snakeroot	*Polygala senega*
SC		Seabeach knotweed*	*Polygonum glaucum*
E		Small-flowered leafcup	*Polymnia canadensis*
T		Swamp cottonwood	*Populus heterophylla*
E		Pondweed	*Potamogeton confervoides*
E		Fries' pondweed	*Potamogeton friesii*
E		Hill's pondweed	*Potamogeton hillii*
E		Ogden's pondweed	*Potamogeton ogdenii*
T		Capillary pondweed	*Potamogeton pusillus ssp. gemmiparus*

State	Federal	Common Name	Scientific Name
E		Straight-leaved pondweed	*Potamogeton strictifolius*
T		Vasey's pondweed	*Potamogeton vaseyi*
SC		Tall cinquefoil	*Potentilla arguta*
SC		Alleghany plum*	*Prunus alleghaniensis*
SC		Grave's beach plum*	*Prunus maritima var. gravesii*
SC		Goose grass*	*Puccinellia tenella ssp. alaskana*
E		Basil mountain-mint	*Pycnanthemum clinopodioides*
E		Torrey mountain-mint	*Pycnanthemum torrei*
SC		Bur oak	*Quercus macrocarpa*
E		Water-plantain spearwort	*Ranunculus ambigens*
E		Seaside crowfoot	*Ranunculus cymbalaria*
SC		Creeping spearwort*	*Ranunculus flammula var. filiformis*
SC		White water-crowfoot	*Ranunculus longirostris*
SC		Bristly buttercup*	*Ranunculus pensylvanicus*
T		Labrador tea	*Rhododendron groenlandicum*
SC		Fragrant sumac (native populations only)*	*Rhus aromatica*
E		Capillary beak-rush	*Rhynchospora capillacea*
T		Beaked rush	*Rhynchospora macrostachya*
E		Long-beaked bald rush	*Rhynchospora scirpoides*
SC		Skunk currant	*Ribes glandulosum*
SC		Swamp black currant*	*Ribes lacustre*
SC		Wild currant	*Ribes rotundifolium*
E		Swamp red currant	*Ribes triste*
SC		Shining rose	*Rosa nitida*
T		Toothcup	*Rotala ramosior*
SC		Sand bramble	*Rubus cuneifolius*
SC		Sea-side dock*	*Rumex maritimus*
SC		Large marsh pink*	*Sabatia dodecandra*

State	Federal	Common Name	Scientific Name
E		Marsh pink	*Sabatia stellaris*
E		Waputo	*Sagittaria cuneata*
SC		Arrowleaf	*Sagittaria subulata*
T		Sandbar willow	*Salix exigua*
E		Bog willow	*Salix pedicellaris*
SC		Slender willow	*Salix petiolaris*
SC		Autumn willow	*Salix serissima*
E		Lizard's tail	*Saururus cernuus*
E		Pod grass	*Scheuchzeria palustris ssp. americana*
SC		Purple oat	*Schizachne purpurascens*
T		Hard-stemmed bulrush	*Schoenoplectus acutus*
T		Torrey bulrush	*Schoenoplectus torreyi*
SC	E	American Chaffseed*	*Schwalbea americana*
SC		Georgia bulrush	*Scirpus georgianus*
SC		Long's bulrush*	*Scirpus longii*
E		Few-flowered nutrush	*Scleria pauciflora var. caroliniana*
E		Reticulated nutrush	*Scleria reticularis*
E		Nutrush	*Scleria triglomerata*
SC		Low nutrush*	*Scleria verticillata*
E		Hyssop skullcap	*Scutellaria integrifolia*
E		Small skullcap	*Scutellaria parvula var. missouriensis*
SC		Wild senna	*Senna hebecarpa*
T		Three-toothed cinquefoil	*Sibbaldiopsis tridentata*
T		Starry champion	*Silene stellata*
SC		Bristly greenbriar*	*Smilax hispida*
SC		Elliott's goldenrod	*Solidago latissimifolia*
SC		Early wrinkle-leaved goldenrod*	*Solidago rugosa var. sphagnophila*
E		Floating bur-reed	*Sparganium fluctuans*
E		Small bur-reed	*Sparganium natans*

State	Federal	Common Name	Scientific Name
T		Canada sand-spurry	*Spergularia canadensis*
SC		Little ladies'-tresses	*Spiranthes tuberosa var. grayi*
E		Rough dropseed	*Sporobolus clandestinus*
T		Sand dropseed	*Sporobolus cryptandrus*
E		Northern dropseed	*Sporobolus heterolepis*
E		Small dropseed	*Sporobolus neglectus*
E		Hyssop-leaf hedge-nettle	*Stachys hyssopifolia*
SC		Smooth hedge-nettle	*Stachys tenuifolia*
SC		Northern stitchwort	*Stellaria borealis*
T		White mandarin	*Streptopus amplexifolius*
SC		Crooked-stem aster*	*Symphyotrichum prenanthoides*
E		Yellow pimpernel	*Taenidia integerrima*
T		Northern white cedar (native populations only)	*Thuja occidentalis*
SC		Appalachian gametophyte	*Trichomanes intricatum*
SC		Cotton bulrush*	*Trichophorum alpinum*
E		False pennyroyal	*Trichostema brachiatum*
E		Narrow-leaved horse gentian	*Triosteum angustifolium*
E		Nodding pogonia	*Triphora trianthophora*
SC		Spiked false oats	*Trisetum spicatum*
T		Spreading globe flower	*Trollius laxus*
E		Bladderwort	*Utricularia resupinata*
E		Large-flowered bellwort	*Uvularia grandiflora*
E		Velvetleaf blueberry	*Vaccinium myrtilloides*
SC		Mountain cranberry*	*Vaccinium vitis-idaea ssp. minus*
SC		Beaked corn-salad*	*Valerianella radiata*
SC		Hybrid bunchflower*	*Veratrum latifolium*
SC		Narrow-leaved vervain*	*Verbena simplex*
SC		Possum haw*	*Viburnum nudum*

State	Federal	Common Name	Scientific Name
SC		Smooth black-haw	*Viburnum prunifolium*
SC		Hook-spurred violet	*Viola adunca*
E		Coast violet	*Viola brittoniana*
SC		Canada violet	*Viola canadensis*
SC		Southern wood violet*	*Viola hirsutula*
SC		Northern bog violet	*Viola nephrophylla*
SC		Kidney-leaf white violet*	*Viola renifolia*
SC		Great-spurred violet	*Viola selkirkii*
SC		Striped violet*	*Viola striata*
SC		New England grape	*Vitis X novae-angliae*
E		Barren strawberry	*Waldsteinia fragarioides*
T		Northern yellow-eyed grass	*Xyris montana*
E		Small's yellow-eyed	*Xyris smalliana*
E		Golden Alexanders	*Zizia aptera*

Effective July 1, 2010
* Extirpated

APPENDIX B
USFWS NEFO "No Species Present" Letter

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087
http://www.fws.gov/newengland

January 17, 2012

To Whom It May Concern:

This project was reviewed for the presence of federally listed or proposed, threatened or endangered species or critical habitat per instructions provided on the U.S. Fish and Wildlife Service's New England Field Office website:

(http://www.fws.gov/newengland/EndangeredSpec-Consultation.htm)

Based on information currently available to us, no federally listed or proposed, threatened or endangered species or critical habitat under the jurisdiction of the U.S. Fish and Wildlife Service are known to occur in the project area(s). Preparation of a Biological Assessment or further consultation with us under section 7 of the Endangered Species Act is not required. No further Endangered Species Act coordination is necessary for a period of one year from the date of this letter, unless additional information on listed or proposed species becomes available.

Thank you for your cooperation. Please contact Mr. Anthony Tur of this office at 603-223-2541 if we can be of further assistance.

Sincerely yours,

Thomas R. Chapman
Supervisor
New England Field Office