SUPPLEMENT TO THE ENVIRONMENTAL ASSESSMENT

MANAGING DAMAGE TO RESOURCES AND THREATS TO HUMAN SAFETY CAUSED BY BIRDS IN THE STATE OF MAINE

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ACRONYMS

APHIS	Animal and Plant Health Inspection Service
BBS	Breeding Bird Survey
BCR	Bird Conservation Region
CBC	Christmas Bird Count
CFR	Code of Federal Regulations
EA	Environmental Assessment
EIS	Environmental Impact Statement
FEIS	Final Environmental Impact Statement
FY	Fiscal Year
GDM	Gull Damage Management
MANEM	Mid-Atlantic, New England Maritime
MBTA	Migratory Bird Treaty Act
MDIFW	Maine Department of Inland Fisheries and Wildlife
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
PBR	Potential Biological Removal
SOP	Standard Operating Procedure
T&E	Threatened and Endangered
US	United States
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
WS	Wildlife Services

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), to analyze the potential impacts of bird damage management activities in the State of Maine (USDA 2013). The EA evaluates the need for bird damage management in Maine to protect agricultural resources, natural resources, property, and human health and safety. WS' proposed action in the EA implements an integrated damage management program in Maine to fully address the need to manage bird damage while minimizing impacts to wildlife populations and the human environment. The EA analyzes the effects of WS' activities to reduce damage and threats associated with double-crested cormorants (*Phalacrocorax auritus*), great blue herons (*Ardea herodias*), turkey vultures (*Cathartes aura*), Canada geese (*Branta canadensis*), feral waterfowl[1], American black ducks (*Anas rubripes*), mallards (*Anas platyrhynchos*), hooded mergansers (*Lophodytes cucullates*), common mergansers (*Mergus merganser*), red-breasted mergansers (*Mergus serrator*), ospreys (*Pandion haliaetus*), bald eagles (*Haliaeetus leucocephalus*), sharp-shinned hawks (*Accipiter striatus*), Cooper's hawks (*Accipiter cooperii*), red-tailed hawks (*Buteo jamaicensis*), American kestrels (*Falco sparverius*), Northern harriers (*Circus cyaneus*), wild turkeys (*Meleagris gallopavo*), rock pigeons (*Columba livia*), downy woodpeckers (*Picoides pubscens*), hairy woodpeckers (*Picoidess villosus*), pileated woodpeckers (*Dryocopus pileatus*), American crows (*Corvus brachyrhynchos*), common ravens (*Corvus corax*), European starlings (*Sturnus vulgaris*), red-winged blackbirds (*Agelaius phoeniceus*), common grackles (*Quiscalus quiscula*), brown-headed cowbirds (*Molothrus ater*), and house sparrows (*Passer domesticus*). Comments from the public involvement process were reviewed for substantive issues and alternatives which were considered in developing the Decision for the EA. After consideration of the analysis contained in the EA and review of public comments, a Decision and Finding of No Significant Impact (FONSI) for the EA was issued on June 27, 2013. The Decision and FONSI selected the proposed action to implement an integrated damage management program using multiple methods to adequately address the need for bird damage management to protect agricultural resources, natural resources, property, and human health and safety.

In addition, an EA was prepared by WS in cooperation with the United States Fish and Wildlife Service (USFWS), to analyze the potential impacts of a herring gull (*Larus argentatus*), ring-billed gull (*Larus delawarensis*), great black-backed gull (*Larus marinus*), and laughing gull (*Larus atricilla*) damage management program in the State of Maine (USDA 2010). The EA evaluates the need for gull damage management (GDM) in Maine to protect agricultural resources, natural resources, property, and human health and safety. After consideration of the analysis contained in the EA and review of public comments, a Decision and Finding of No Significant Impact (FONSI) for the EA was issued on September 24, 2010. The Decision and FONSI selected the proposed action to implement an integrated damage management program using multiple methods to adequately address the need for gull damage management to protect agricultural resources, natural resources, property, and human health and safety. However, changes in the scope of WS' gull management program have occurred since the 2010 decision.

[1]Free-ranging or feral domestic waterfowl refers to captive-reared, domestic, of some domestic genetic stock, or domesticated breeds of ducks, geese, and swans. Examples of domestic waterfowl include, but are not limited to, mute swans, Muscovy ducks, Pekin ducks, Rouen ducks, Cayuga ducks, Swedish ducks, Chinese geese, Toulouse geese, Khaki Campbell ducks, Embden geese, and pilgrim geese. Feral ducks may include a combination of mallards, Muscovy duck, and mallard-Muscovy hybrids.

Since many of the methods and regulations listed in the 2013 bird management EA are relevant to gull management, WS has decided to incorporate the analysis of WS' expanded gull management program into the 2013 bird management EA.

PURPOSE

This supplement to the EA examines potential environmental impacts of WS' program as it relates to: 1) The expanded management of ring-billed gull, herring gull, great black-backed gull, and laughing gull damage; 2) The addition of the snowy owl (*Bubo scandiacus*) and the rough-legged hawk (*Buteo lagopus*) damage management; and, 4) new information that has become available from research findings and data gathering since the issuance of the Decision and FONSI in 2013. All information and analyses in the 2013 EA remain valid unless otherwise noted below.

NEED FOR ACTION

Need for GDM to Protect Human Health and Safety

Human health and safety concerns and problems associated with gulls include, but are not limited to transmission of zoonotic diseases to humans, contamination of municipal drinking water sources, and bird-aircraft strikes.

Need for GDM to Reduce Potential for Disease Transmission

Birds play an important role in the transmission of zoonotic diseases to humans such as Encephalitis, West Nile Virus, Psittacosis, and Histoplasmosis. Public health officials as well as workers and residents at sites with large numbers of gulls express concerns for human health related to the potential for disease transmission where fecal droppings accumulate. Some bird species, including gulls, form large communal roosts of the kind associated with disease organisms which grow in soils enriched by bird excrement, such as *Histoplasma capsulatum* (Weeks and Stickley 1984). Sometimes, such roosts occur in urban and suburban areas. Many times, individuals or property owners that request assistance with nuisance gull problems are concerned about potential disease risks but are unaware of the types of diseases that can be associated with those birds. In most situations, GDM is requested because the accumulation of droppings left by concentrations of birds is aesthetically displeasing and can result in recurrent clean-up costs

Need for GDM to Reduce Potential for Disease Transmission and Contamination of Drinking Water Sources

The literature documents that gulls have taken advantage of the increase in the human population and its standard of living, and roosting on inland water bodies including reservoirs at night (Gray 2008). Public health concerns often arise when gulls feed and loaf near fast food restaurants, and picnic facilities; deposit waste from landfills in urban areas and drinking water reservoirs; and contaminate industrial facility ventilation systems with feathers, nesting debris, and droppings. Gulls feeding on vegetable crops and livestock feed can potentially aid in the transmission of salmonella. Research has shown that gulls carry various species of bacteria such as *Bacillus*

spp., *Clostridium* spp., *Campylobacter* spp., *Escherichia coli*, *Listeria* spp., and *Salmonella* spp. (MacDonald and Brown 1974, Fenlon 1981, Butterfield et al. 1983, Monaghan et al. 1985, Norton 1986, Vauk-Hentzelt et al. 1987, Quessey and Messier 1992). Transmission of bacteria from gulls to humans is difficult to document; however, Reilley et al. (1981) and Monaghan et al. (1985) both suggested that gulls were the source of contamination for cases of human salmonellosis. Gulls threaten the safety of municipal drinking water sources by potentially causing dangerously high levels of coliform bacteria from their fecal matter. The United States Environmental Protection Agency (EPA) monitors the safety of public drinking water supplies and has expressed concern to Maine municipalities regarding high bacteria levels. Several municipalities have drinking water sources which are unfiltered and therefore must comply with strict EPA guidelines regarding maximum allowable levels of fecal coliform bacteria. Contamination of public water supplies by gull feces has been stated as the most plausible source for disease transmission (e.g., Jones et al. 1978, Hatch 1996). Gull feces has also been implicated in accelerated nutrient loading of aquatic systems (Portnoy 1990), which could have serious implications for municipal drinking water sources.

Bird management to protect drinking water is not unprecedented. Several municipalities and agencies have recognized a strong correlation between increasing numbers of gulls and other waterfowl at drinking water sources and increased fecal coliform concentrations. This issue is well documented at Wachusett and Quabbin Resevoirs in Massachussetts where a bird harassment program was implemented in 1993 (MA DOCR 2010). The bird harassment program has been successful in reducing the bird's impacts, however, the Massachusetts Department of Conservation and Recreation (MADCR) would like to see the number of gulls roosting on the reservoirs substantially reduced or eliminated (MA DOCR 2011). The New York City Department of Environmental Protection also identified birds as a significant source of fecal coliform at several NYC reservoirs. NYC DEP successfully lowered fecal coliform to compliant levels in their reservoirs after the initiation of a waterbird management program (NYC DEP 2009).

In addition, the United States Environmental Protection Agency warns that birds such as gulls and geese are reported to be the most common and significant sources of contamination of open reservoirs. The US EPA suggests managing and harassing wildlife as a method to prevent contamination of drinking water (US EPA 2001). Published literature documents gulls feeding at sewage treatment plants and outfalls and landfills and transporting pathogenic bacteria to other areas such as drinking water sources (Bogomolni et al 2006, Ferns and Mudge 2000, Nelson et al 2008, and Alderisio and Deluca 1999). Gulls are also known carriers of pathogenic bacteria, including drug resistant bacteria (Bogomolni et al 2006).

Managing fecal contamination of drinking water sources by gulls is one reason WS is increasing the proposed take of gulls in this supplement compared to the 2010 Gull EA.

Need for GDM at Airports/Airbases

The risk that birds pose to aircraft is well documented with the worst case reported in Boston in 1960 when 62 people were killed in the crash of an airliner which collided with a flock of European starlings (Terres 1980). Other examples include:

- On November 10, 2002, Aircraft BA-125-700 struck a flock of gulls at an airport in Maine. The pilot conducted a precautionary landing. The strike caused damage that required $250,000 worth of repairs, and an additional $200,000 in other costs. The aircraft was out of service for 1,440 hours (FAA 2009).
- From January 1990 through July 2014, at least 136 aircraft strikes have been reported in Maine involving gulls (Dolbeer et al. 2012).

It is widely recognized throughout the civil and military aviation communities that the threat to human health and safety from aircraft collisions with wildlife is increasing (Dolbeer 2000). Collisions between aircraft and wildlife are a concern throughout the world because they threaten passenger safety (Thorpe 1996), result in lost revenue and costly repairs to aircraft (Linnell et al. 1996, Robinson 1996), and can erode public confidence in the air transport industry as a whole (Conover et al. 1995). In 2000, a Boeing 747 ingested a western gull on take-off from Los Angeles International Airport. Parts of the engine fell onto a beach and the pilot dumped 83 tons of fuel into the ocean before making an emergency landing. The cost of repairs to the plane was $400,000 (Cleary et al. 2002).

Dolbeer et al. (2012) reported that gulls were the most commonly struck bird group from 1990 through 2008. Gull strikes represent nearly 26% of all reported wildlife strikes in Maine. The United States Air Force (USAF) reports that herring gulls, ring-billed gulls, and laughing gulls have been identified in 593 aircraft strikes across the U.S. resulting in nearly $8.7 million in damages to aircraft (USAF 2009).

Need for GDM at Landfills

Gull attraction to landfills as a food source has been well documented (Mudge and Ferns 1982, Patton 1988, Belant et al. 1995, Gabrey 1997, Belant et al. 1998). Large numbers of gulls are attracted to and use landfills as feeding and loafing areas throughout North America. In the northeastern U.S., landfills often serve as foraging and loafing areas for gulls throughout the year, while attracting larger populations of gulls during migration periods (Bruleigh 1998). Landfills have even been suggested as contributing to the increase in gull populations (Verbeek 1977, Patton 1988, Belant and Dolbeer 1993). Regulations mandate that landfills prevent or control potential vectors, such as gulls (40 CFR 258.22). Gulls that visit landfills may loaf and nest on nearby drinking water supplies or rooftops, causing health concerns, aesthetic distractions and structural damage to buildings and equipment.

Bird conflicts associated with landfills include accumulation of feces on equipment and buildings, distraction of heavy machinery operators, and the potential for birds to transmit disease to workers on site. The tendency for gulls to carry waste off site results in accumulation of feces and deposition of garbage on surrounding industrial and residential areas creates a nuisance, as well as generates the potential for birds to transmit disease to neighboring residents.

Need for GDM to Reduce Injury Threats

Nesting herring and great black-backed gulls are often highly aggressive when defending their eggs and young. The WS program in Maine often receives requests for assistance from property

managers with concerns about potential threats of injury, particularly to workers on rooftops. Threats to safety can involve an actual attack and the risk of falls when attempting to avoid attack. WS has documented injuries to humans from herring gull attacks requiring medical treatment.

Need for GDM to Protect Agriculture

Agriculture continues to be an important sector in the Maine economy with the value of agricultural production totaling nearly $763 million in 2012 (New England Agricultural Statistics 2012). Agricultural production occurs on over 1.45 million acres of land in Maine on 8,173 farms (New England Agricultural Statistics 2012). The value of aquaculture products sold totaled nearly $7.5 million in 2012. The aquaculture industry in Maine raises a variety of freshwater and marine organisms including trout, salmon, oysters, clams, mussels, scallops, and urchins (New England Agricultural Statistics 2012).

Need for GDM to Protect Aquaculture and Fishery Resources

Aquaculture, the cultivation of finfish and invertebrates in captivity, has grown exponentially in the past several decades (Price and Nickum 1995). Damage to aquaculture resources occurs primarily from the economic losses associated with birds consuming fish and other commercially raised aquatic wildlife. Damage can also result from the death of fish and other aquatic wildlife from injury associated with bird predation as well as the threat of disease transmission from one impoundment to another or from one aquaculture facility to other facilities as birds move between sites. The principal species propagated in Maine are trout and mollusks (NASS 2012). In 2012, there were 68 commercial aquaculture facilities in Maine with nearly $7.5 million in sales (NASS 2012). Gulls can feed on fish being raised at state fish hatcheries as well as commercial hatcheries or aquaculture facilities. There are ten state operated fish hatcheries in Maine. It is possible that gulls compete with farm raised Atlantic salmon for feed in offshore pens (B. Allen, Maine Department of Inland Fisheries and Wildlife (MDIFW), pers. comm. 2007) and function as vectors for the spread of disease at aquaculture facilities.

Maine is a large producer of lobster and mussels. Lobster pounds and mussel farms hold lobsters in pens that are in tidal waters. When the tide is low, the gulls grab the lobsters and mussels and feed on them. The WS program in Maine has recommended depredation permits to the owners of these facilities to manage gull damage during low tide.

Need for GDM at Cattle and Hog Feeding Facilities

In 2012, Maine cattle and hog operations reported cash receipts totaling $249,963,000 and $1,726,000 respectively (New England Agricultural Statistics 2012). Gulls often cause damage at cattle and hog feeding facilities by congregating in large numbers to feed on bakery waste or fish meal used as cattle and hog feed. Such feeding strategies present disease threats to livestock at such sites. Williams et al. (1977) and Johnston et al. (1979) reported that gulls can transmit salmonella to livestock through droppings and contaminated drinking water. The birds also cause damage by defecating on fences, shade canopies, and other structures, which can

accelerate corrosion of metal components and is generally considered an unsightly nuisance and potential health hazard for the feedlot operators and their personnel.

Maine also has unique island sheep farms. Those farms, located on isolated islands, produce highly desirable wool and meat. The sheep roam free on the island feeding on seaweed and grass that stays green year round. Great black-backed gulls have been observed predating on the newborn lambs on these islands (B. Allen, MDIFW, pers. comm. 2007). While this can be a serious problem to individual producers it does not threaten the overall economic viability of sheep production.

Need for GDM Related to Agricultural Crops

Although gulls do not generally feed on agricultural crops, they do cause damage. Gulls, particularly ring-billed gulls, feed on earthworms, insects and other invertebrates in open fields. This often results in the trampling of young plants resulting in reduced yields or replanting. In addition, there may be the threat of bacterial contamination of vegetable crops due to accumulation of droppings, particularly if gulls have recently fed or loafed at landfills or sewage treatment plants. Maine has a large blueberry industry and gulls negatively affect those farms primarily by trampling plants and to a lesser extent by eating the berries and contaminating the ones left on the bush with fecal matter.

Maine farmers produce a wide variety of cash crops throughout the state including corn, hay, potatoes, blueberries, vegetables (cucumbers, snap beans, tomatoes, watermelons, cantaloupes, squash, broccoli, spinach, and other greens) nursery crops, and floriculture.

Need for GDM to Protect Property

Gulls frequently damage structures on private property, or public facilities, with fecal contamination. Accumulated bird droppings can reduce the functional life of some building roofs by 50% (Weber 1979). Corrosion damage to metal structures and painted finishes, including those on automobiles, can occur because of uric acid from bird droppings. This can be compounded by gulls walking in the droppings which commonly contain abrasive material such as sand passed through the digestive tract. Roof-top colonies of nesting gulls have been well documented and frequently cause damage to urban and industrial structures. Nesting gulls peck at spray on foam roofing and rubber roofing material, including caulking. This creates holes that must be repaired or roof leaks can result. Gulls transport large amounts of nest material and food remains to the roof-tops which can obstruct roof drainage systems and lead to structural damage or roof failure if clogged drains result in rooftop flooding (Vermeer et al. 1988, Blokpoel and Scharf 1991, Belant 1993).

Need for GDM to Protect Wildlife, Including T&E Species

Gulls can also negatively impact natural resources through habitat degradation, competition with other wildlife, and through direct depredation on natural resources. Habitat degradation occurs when large concentrations of gulls in a localized area negatively impact characteristics of the surrounding habitat that can adversely affect other wildlife species and can be aesthetically

displeasing. Competition can occur when two species compete (usually to the detriment of one species) for available resources, such as food or nesting sites. Direct depredation occurs when predatory gull species feed on other wildlife species which can negatively influence those species' populations, especially when depredation occurs on threatened and endangered (T&E) species.

Habitat degradation occurs primarily in areas where colonial waterbirds nest or where the gregarious roosting behavior of gulls occurs. The degradation of habitat occurs from the continuous accumulation of fecal droppings that occurs under nesting colonies of gulls or under areas where gulls consistently roost. Over time, the accumulation of fecal droppings where colonial waterbirds, such as gulls, nest can lead to the loss of vegetation due to the ammonium nitrogen found in the fecal droppings of gulls. Ammonium toxicity from fecal droppings may be an important factor contributing to the declining presence of vegetation on some islands in the Great Lakes (Hebert et al. 2005).

Some species listed as threatened or endangered under the Endangered Species Act of 1973 (ESA) are preyed upon or otherwise adversely affected by certain bird species. Concentrations of gulls often impact the productivity and survivorship of rare or endangered colonial species such as terns (U.S. Department of the Interior (USDI) 1996) and prey upon the eggs and chicks of colonial waterbirds. WS has provided assistance with protecting endangered species including protection of roseate terns, least terns, and piping plovers in Maine from predation and has experienced an increase in requests of this nature in recent years. Consequently, this is another reason WS is increasing the proposed take of gulls in this supplement compared to the 2010 Gull EA.

Snowy owl and rough-legged hawk Damage Threats

The WS program in Maine has received several requests by airports to remove snowy owls and rough-legged hawks that pose a threat to flight safety and additional requests for assistance are likely. The presence of snowy owls and rough-legged hawks in vicinity of airports is of concern due to the threat of aircraft striking them. Aircraft striking wildlife can cause significant damage to aircraft and threatens the safety of passengers. Several snowy owls and rough-legged hawks were observed at several airports in Maine and were observed perching on airport-related structures, as well as crossing runways and taxiways which are used by aircraft. Airport employees have utilized harassment techniques to disperse these birds, but the owls and hawks often do not leave the area. There have been 64 wildlife strikes involving rough-legged hawks and 84 wildlife strikes involving snowy owls in the United States between the years of 1990 and 2012 (Dolbeer et al. 2012).

RELATIONSHIP OF THIS ENVIRONMENTAL ASSESSMENT TO OTHER ENVIRONMENTAL DOCUMENTS

Environmental Assessment: Laughing Gull Management Plan for Seabird Restoration Islands in Maine:

The Maine Coastal Islands National Wildlife Refuge has issued an Environmental Assessment on the effects of reducing the number of laughing gulls breeding on four islands in Maine to increase the productivity of Arctic terns, common terns, and roseate terns.

DECISION TO BE MADE

Based on the scope of this supplement, the decisions to be made are:

- How can WS best respond to the need to reduce bird damage in Maine?
- Do the alternatives have significant cumulative impacts meriting an Environmental Impact Statement (EIS)?

SCOPE

Actions Analyzed

This EA and supplement evaluate the need for bird damage management to reduce threats to human safety and to resolve damage to property, natural resources, and agricultural resources on federal, State, tribal, municipal, and private land within the State of Maine, wherever such management is requested by a cooperator.

Period for which this Supplemental EA is Valid

Unless it is determined that an Environmental Impact Statement (EIS) is needed, the supplemented EA will remain valid until WS determines that new needs for action or new alternatives having different environmental effects must be analyzed. At that time, this analysis will be revised as necessary. Review of the EA will be conducted each year to ensure that it is complete and still appropriate to the scope of bird damage management (BDM) activities within Maine.

Site Specificity

The EA and supplement analyze the potential impacts of bird damage management on all public and private lands in Maine under MOU, Cooperative Agreement, and in cooperation with the appropriate public land management agencies. The site specificity of the EA will remain as addressed in section 1.3 of the EA (USDA 2013).

Chapter 2 of the EA identifies and discusses issues relating to bird damage management in Maine. The standard WS Decision Model (Slate et al. 1992) would be the site-specific procedure for individual actions conducted by WS in the State (see Chapter 3 of the EA for a description of the Decision Model and its application). Decisions made using the model would be in accordance with WS' directives[2] and Standard Operating Procedures (SOPs) described in the EA as well as relevant laws and regulations.

The analyses in this EA and supplement are intended to apply to any action that may occur in any locale and at any time within Maine. In this way, WS and the USFWS believes it meets the intent of the NEPA with regard to site-specific analysis and that this is the only practical way for WS and the USFWS to comply with the NEPA and still be able to address damage and threats associated with birds.

[2]At the time of preparation, WS' Directives could be found at the following web address: http://www.aphis.usda.gov/wildlife_damage/ws_directives.shtml.

Summary of Public Involvement

Wildlife Services released a pre-decisional Bird EA (PDEA) on May 16, 2013 and a Notice of the proposed action and invitation for public involvement was placed in the *Kennebec Journal*. A letter noticing the availability of the PDEA was also sent to those persons that have a known interest in the Maine Bird Damage Management program. A copy of the pre-decisional supplement and a notice regarding the opportunity for public comment on the EA was also made available at (http://www.aphis.usda.gov/wildlife_damage/nepa.shtml). The review/comment period came to a close on June 14, 2013. WS received one comment letters on the EA. WS responses to specific comments are included in Appendix A of the Decision and FONSI for the EA. All letters and comments are maintained at the Wildlife Services State Office in Augusta, Maine.

This supplement is also made available to the public for a 30 day comment period. A notice of availability will be published in *The Kennebec Journal* the WS stakeholder registry. A copy of the pre-decisional supplement and a notice regarding the opportunity for public comment on the supplement will also be made available at (http://www.aphis.usda.gov/wildlife_damage/nepa.shtml). Public notification procedures are in compliance with new WS NEPA implementation procedures published in the Federal Register March 21, 2007 (Vol. 72, No. 54: 13237-13238).

AUTHORITY AND COMPLIANCE

Authority of federal and state agencies to manage wildlife damage in the State of Maine remains applicable as listed in the Bird EA and Gull EA.

COMPLIANCE WITH FEDERAL AND STATE LAWS

Several laws or statutes authorize, regulate, or otherwise affect the activities of WS and the USFWS. WS and the USFWS would comply with those laws and statutes and consults with other agencies as appropriate. WS would comply with all applicable federal, state, and local laws and regulations in accordance with WS Directive 2.210. Those laws and regulations relevant to managing bird damage in the state are addressed in the bird damage managementEA and have not changed.

ISSUES

Issues are concerns raised regarding potential environmental problems that might occur from a proposed action. Such issues must be considered in the NEPA decision-making process. Issues relating to the reduction of wildlife damage were raised during the scoping process in the preparation of the EA. Issues related to managing damage and threats associated with birds in Maine were developed by WS in consultation with the USFWS and MDIFW.

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 address those issues are discussed in Chapter 4 of the EA (USDA 2013). Potential impacts of Alternatives 2, 3, and 4 on the human

environment related to the major issues have not changed from those described in the EA and are not limited to species-specific factors; thus they 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, describes an integrated bird management program in that responds to requests for BDM to protect agricultural resources, natural resources, property, and human health and safety. This supplement provides an analysis of potential impacts for each of the major issues analyzed in the EA since the completion of the EA and the proposed supplement to the EA as related to Alternative 1 (proposed action/no action alternative):

The following issues were identified as important to the scope of the analysis:

Bird EA (USDA 2013) Issues:

- Issue 1 - Effects of Damage Management Activities on Target Bird Populations
- Issue 2 - Effects on Non-target Wildlife Species Populations, Including T&E Species
- Issue 3 - Effects of Damage Management Methods on Human Health and Safety
- Issue 4 - Effectiveness of Damage Management Methods
- Issue 5 - Effects on the Aesthetic Values of Birds
- Issue 6 - Humaneness and Animal Welfare Concerns of Methods
- Issue 7 – Effects of Bird Damage Management Activities on the Regulated Harvest of Birds[3]

ALTERNATIVES

Alternative 1 was selected by the decision maker in the Decision/FONSI (2013) to respond to the issues pertaining to BDM. Additionally, Section 3.3 of the EA discusses three additional alternatives that were considered but not analyzed in detail. A detailed discussion of the effects of the Alternatives is described in the EA and remains as analyzed. Below is a summary of Alternative 1.

Bird EA Alternative 1 - Continuing the Current Integrated Approach to Managing Bird Damage (Proposed Action/No Action) (USDA 2013)

The proposed action/no action alternative would continue the current implementation of an adaptive integrated approach utilizing non-lethal and lethal techniques, as deemed appropriate

[3] This issue will not be analyzed in this supplement as the additional species added to this EA are not game species, and therefore, will be insignificant to regulated harvest.

using the WS Decision Model (Slate et al. 1992; WS Directive 2.201), to reduce damage and threats caused by birds in Maine. A major goal of the program would be to resolve and prevent bird damage and to reduce threats to human safety[4]. To meet this goal, WS, in cooperation with the USFWS and in consultation with the MDIFW, would continue to respond to requests for assistance with, at a minimum, technical assistance, or when funding was available, operational damage management. Therefore, under this alternative, WS could respond to requests for assistance by: 1) taking no action if warranted, 2) providing only technical assistance to property owners or managers on actions they could take to reduce damages caused by birds, or 3) providing technical assistance and direct operational assistance to a property owner or manager experiencing damage. Funding for activities conducted by WS could occur through federal appropriations; however, in most cases, those entities requesting assistance would provide the funding for activities conducted by WS.

ENVIRONMENTAL IMPACTS

This analysis is intended to update sections of the environmental impact analysis in the bird damage management EA and includes the addition of a new species to the EA. This section summarizes the existing environment relative to the identified issues. Except as summarized below, impacts to all other species remain as analyzed in the bird damage management EA. A summary of WS bird harassment and lethal bird take by fiscal year is provided in the individual species population impact analyses section. The changes in the anticipated maximum level of annual lethal take would only apply to Alternative 1 and are addressed as such.

Bird Population Estimates

The analysis for magnitude of impact from lethal take can 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 trend data. Information on bird populations and trends are often derived from several sources including the BBS, the CBC, the Partners in Flight Landbird Population database, published literature, and harvest data. Also, the USFWS prepared PBR models using population parameters for each gull species to estimate the allowable take level for gulls in BCR 14 and BCR 30 which is described in detail in the Gull EA in Section 4.1.

PBR Model

Population parameter estimates were taken from available literature for each gull species (Table 1), or in cases where estimates were not available, surrogate estimates from closely-related species were used (Seamans et al. 2007). Because there was uncertainty associated with demographic parameter estimates, allowable take levels were calculated using a simulation approach to estimate a range of R_{max} values with parameter estimates randomly drawn from normal distributions based on reported standard errors (Table 1; Seamans et al. 2007).

To use the PBR method to determine levels of allowable take, or cumulative impacts over a large

[4]All management actions conducted or recommended by WS would comply with appropriate federal, state, and local laws in accordance with WS Directive 2.210.

geographic area, the information required includes a minimum estimate of the population size using science-based monitoring programs (*e.g.*, BBS, CBC, coordinated colony surveys), and the intrinsic rate of population growth. The formula for PBR is:

$$PBR = ½ R_{max} N_{min} F_R$$

where R_{max} is the maximum population growth rate at low densities, and in the absence of removal (Runge et al. 2004), N_{min} is the minimum population size, and F_R is a recovery factor ranging from 0.1 to 2.0. The recovery factor is a qualitative assessment that is typically set at low levels for endangered ($F_R = 0.1$) or threatened species ($F_R = 0.5$; Taylor et al. 2000), or if the status of the population is poorly known (Runge et al. 2004). However, using a recovery factor above 1.0 has been discussed for species in which the management objective is to hold the population at a smaller fraction of its carrying capacity (Runge et al. 2009). To estimate R_{max} for gulls, the Slade formula (Slade et al. 1998) was used:

$$1 = p\lambda^{-1} + 1_{\alpha}\, b\lambda^{-\alpha} - l_{\alpha} b p^{(\omega-\alpha+1)}\, \lambda^{-(\omega+1)}$$

where p is adult annual survival rate, $l\alpha$ is the survival rate from birth to age at first reproduction, b is the number of female offspring per female of reproductive age per year, α is the age at first reproduction, ω is the age at last reproduction, and λ is the intrinsic rate of population change. After solving the above equation for λ, R_{max} was estimated as $\ln(\lambda)$.

Table 1 - Demographic parameter estimates (θ) used for estimating R_{max} and Potential Biological Removal of gulls in BCR 14 and BCR 30 (Seamans et al. 2007).

		Great black-backed gull[1]		Herring gull[2]		Laughing gull[3]		Ring-billed gull[4]	
Parameter	**Age class**	**(θ)**	**SE (θ)**	**(θ)**	**SE (θ)**	**(θ)**	**SE (θ)**	**(θ)**	**SE (θ)**
p	Adult	0.87	0.03	0.87	0.03	0.87	0.03	0.87	0.03
$l\alpha$	Adult	0.42		0.42		0.56		0.56	
	Hatch Year	0.729	0.035	0.729	0.035	0.729	0.035	0.729	0.035
	Second Year	0.886	0.024	0.886	0.024	0.886	0.024	0.886	0.024
b		0.784	0.018	0.752	0.022	0.752	0.022	0.752	0.022
α		5		5		3		3	
ω		19		20		19		19	
N_{min}		250,000		390,000		270,000		54,000	
R_{max}		0.09	0.027	0.086	0.027	0.113	0.036	0.113	0.036

[1]Good 1998,
[2]Pierotti and Good 1994,
[3]Burger 1996, Dinsmore and Schreiber 1974
[4]Ryder 1993, Seamans et al. 2007

Population estimates (N_{min}) for each species were based on the number of gulls at known

breeding colonies in BCR 14 and BCR 30 during the mid-1990s (MANEM Regional Waterbird Plan 2006), and adjusted using a conservative estimate of 0.75 non-breeding gull per breeder to estimate the total population (Seamans et al. 2007). Allowable take levels (± 95 CI) for each of the four gull species addressed in this assessment under three recovery factors (0.5, 1.0, 1.5) in BCR 14 and BCR 30 are presented in Table 2.

The PBR models were developed by the USFWS for BCR 14 and BCR 30 to evaluate harvest levels for gulls in the northeastern United States to ensure take occurs within levels to achieve desired population objectives for those species. The four gull species addressed in this assessment are known to breed along coastal areas and inland sites that are contained within BCR 14 and BCR 30. Since population estimates and trends for gulls are limited, the PBR models were developed by the USFWS for BCR 14 and BCR 30 to analyze potential population impacts from lethal take since the gulls present in the northeastern United States are likely those gulls migrating from and nesting in BCR 14 and BCR 30. Given the close geographical proximity of states in the northeastern United States and given the mobility of gulls, assessing allowable take for each State in the northeast would be difficult. Some concerns arise regarding the use of regional gull population estimates for assessing allowable take in BCR 14 and BCR 30 as opposed to the more specific breeding population estimates in the state. To address those concerns the analyses for each species will include the evaluation of proposed take levels as those take levels relate to the statewide breeding population and how the proposed take relates to the PBR model for gulls in BCR 14 and BCR 30.

Table 2 - Potential Biological Removal (± 95% CI) of gulls in BCR 14 and BCR 30 under 3 recovery factors (Seamans et al. 2007).

Species	$F_R = 0.5$	$F_R = 1.0$	$F_R = 1.5$
Laughing Gull	7,685 (3,927 – 12,685)	15,274 (7,188 – 23,042)	26,044 (10,798 – 34,818)
Herring Gull	8,360 (3,892 – 12,656)	16,725 (7,788 – 25,397)	25,048 (11,716 – 37,875)
Great Black-backed Gull	5,614 (2,764 – 8,358)	11,234 (5,561 – 16,670)	16,853 (8,364 – 25,086)
Ring-billed Gull	1,532 (713 – 2,318)	3,065 (1,455 – 4,634)	4,588 (2,161 – 6,951)

Most states in the northeastern U.S. conduct colonial waterbird surveys to determine breeding population trends for many colonial waterbirds, including gulls. Most state-level population estimates are provided as the number of breeding pairs of gulls surveyed. Therefore, one breeding pair equals two gulls. Gulls are migratory bird species and the breeding population of gulls estimated at the state-level is only representative of the number of gulls present in a state during a short period of time (breeding season) and does not account for migratory gulls present during the winter nor do breeding colony surveys account for the population of non-breeding gulls present during the breeding season. Therefore, to better account for the mobility of gulls and the fact that gulls present in the northeastern United States are likely gulls that nest and migrate through BCR 14 and BCR 30, the USFWS developed models based on the geographical scope of the nesting populations of gulls. In addition, the PBR models developed by the USFWS

are based on breeding and non-breeding gulls which are often not included in surveys conducted at colonial nesting sites. Since the take of gulls to alleviate damage can occur throughout the year and not just during the breeding season, a comprehensive model like the PBR that includes non-breeding populations of gulls allows for a more systemic analysis of allowable take on gull populations.

Bird populations can be monitored by using trend data derived from data collected during the Breeding Bird Survey (BBS). Under established guidelines, observers count birds at established survey points for a set duration along a pre-determined route, usually along a road. Surveys were started in 1966 and are conducted in June which is generally considered as the period of time when those birds present at a location are likely breeding in the immediate area. The BBS is conducted annually in the United States, across a large geographical area, under standardized survey guidelines. The BBS is a large-scale inventory of North American birds coordinated by the United States Geological Survey, Patuxent Wildlife Research Center (Sauer et al. 2014). The BBS is a combined set of roadside survey routes primarily covering the continental United States and southern Canada. The primary objective of the BBS has been to generate an estimate of population change for all breeding birds. Populations of birds tend to fluctuate, especially locally, as a result of variable local habitat and climatic conditions. Trends can be determined using different population equations and statistically tested to determine if a trend is statistically significant.

Current estimates of population trends from BBS data are derived from hierarchical model analysis (Link and Sauer 2002, Sauer and Link 2011) and are dependent upon a variety of assumptions (Link and Sauer 1998). The statistical significance of a trend for a given species is also determined using BBS data (Sauer et al. 2014).

Impacts on Target Species

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 gull species addressed in the EA. Methods employed in an integrated approach to reduce damage and threats are categorized into non-lethal and lethal methods. Non-lethal methods are employed to exclude, harass, and/or disperse wildlife from areas where damage or threats are occurring. Lethal methods are often employed to reinforce non-lethal methods and to remove birds that have been identified as causing damage or posing a threat to human safety. Both non-lethal and lethal methods have the potential to impact gull populations. WS' Standard Operating Procedures (SOP) are designed to reduce the effects on bird populations and are discussed in section 3.3 of the EA (USDA 2013).

The following is a summary of WS' activities to manage damage and threats caused by gulls in Maine as requested by those seeking assistance over the past five years (Table 3). Also, 17 herring gull nests were destroyed in 2012.

Table 3: Number of gulls taken and dispersed in Maine by WS from FY 2009-2013

	2009		2010		2011		2012		2013	
	Take	**Dispersed**	**Take**	**Dispersed**	**Take**	**Dispersed**	**Take**	**Dispersed**	**Take**	**Dispersed**
GBBG	16	NA	37	200	8	145	10	95	3	170
HERG	81	4,161	131	4,529	161	3,217	153	3,512	54	4,687
RBGU	234	5,997	236	6,797	254	3,520	338	8,399	209	6,378
LAGU	0	0	0	0	0	0	0	0	0	0

Population Impact Analysis of the Proposed Supplement to the EA

Herring Gull Population Impact Analysis (Direct, Indirect, and Cumulative)

In the 1970's the breeding population of herring gulls in the U.S. was 184,278 birds distributed among 414 nesting sites (MANEM 2006). By the 1990's the breeding population of herring gulls in the U.S. had declined 19% to 148,416 birds while the number of nesting sites increased to 468 (MANEM 2006). In contrast, the population of herring gulls in the southern New England and Mid-Atlantic Regions is estimated at approximately 66,000 breeding pairs (MANEM Regional Waterbird Plan 2006). Herring gulls have decreased approximately 38% in the same area between 1970 and into the 1990s (MANEM Regional Waterbird Plan 2006), although the statewide population of breeding herring gulls has increased slightly over the past 15 years in Maine. In 1990, the statewide population of herring gulls was estimated at 27,000 breeding pairs (Pierotti and Good 1994). Currently, the MDIFW estimates the number of breeding pairs at approximately 21,488 nesting pairs on 180 coastal islands for the state of Maine (B. Allen, MDIFW, pers. comm. 2014). According to the MANEM Waterbird Conservation Plan, herring gulls are considered a species of low concern in North America (MANEM Regional Waterbird Plan 2006).

BBS data for herring gulls in the eastern BBS region shows a declining trend estimated at 3.04% annually from 1966–2012 and 1.53% annually from 2001–2011 (Sauer et al. 2014). Similarly, in the New England/Mid-Atlantic coast BBS region herring gull populations have declined at an estimated 4.55% annually since 1966 (Sauer et al. 2014). In Maine, BBS data shows a declining trend at 5.01% since 1966 (Sauer et al. 2014). CBC data for herring gulls observed overwintering in Maine shows a decreasing trend from 1966-2013 (National Audubon Society 2010). The herring gull population in BCR 30 has been given a conservation rank of low concern, and in BCR 14 the population has been given a rank of moderate concern (MANEM 2006). In BCR 30, the breeding population of herring gulls is estimated at 90,734 and in BCR 14 the breeding population is estimated at 196,182 (MANEM 2006).

The number of herring gulls taken or dispersed by WS in Maine and the total number of gulls taken by all entities in Maine to alleviate damage and threats associated with these birds are shown in Table 4. From 2009 through 2013, WS lethally removed an average of 116 herring gulls, five nests, seven eggs and used non-lethal methods to disperse 4,021 gulls in Maine (Table 4). A total of 2,687 herring gulls (537 gulls per year, on average) were taken by all entities to alleviate damage and threats associated with these birds occurring in the Maine from 2009 to 2013 (P.Carota, USFWS, pers. comm. 2014).

Table 4 – Number of herring gulls addressed from 2009 to 2013.

Year	Dispersed by WS[1]	Take under Depredation Permits			
		Adults		Nests	
		WS' Take[1]	Total Take by All Entities[2]	WS' Take[1]	Total Take by All Entities[2]
2009	4,161	81	120	10	473
2010	4,529	131	303	0	951
2011	3,217	161	719	0	323
2012	3,512	153	809	17	712
2013	4,687	54	736	0	724
TOTAL	**20,106**	**580**	**2,687**	**27**	**3,183**

[1]Dispersal or take in Maine, data reported by federal fiscal year
[2]Take data reported by calendar year; includes WS' take

To address increased requests for assistance to manage damage and threats associated with herring gulls, WS proposes that up to 600 herring gulls, 600 nests, and 1,800 eggs could be removed annually by WS to alleviate damage and threats, which includes removal of up to 50 herring gulls and 50 nests during activities to protect nesting shorebirds as addressed in the Nest Predator EA (USDA 2013). The increased level of take analyzed is in anticipation of requests to protect threatened and endangered nesting bird colonies, to address damage and threats of damage occurring at airports where they pose a strike hazard to aircraft, and at drinking water sources where they feed and loaf causing a disease threat to human health and safety from excessive accumulations of droppings. This increased level of take is also in anticipation of damage caused to buildings by nesting and loafing gulls.

Take of 600 herring gulls would represent 1.4% of the estimated herring gull population in Maine based on 21,488 breeding pairs. However, the actual herring gull population in the state is likely higher since current estimates do not include non-breeding herring gulls and urban rooftop nesting herring gulls that are also present. Therefore, an annual take of up to 600 gulls by WS would likely represent a smaller percentage of the actual statewide herring gull population present in the state during the breeding season. Herring gulls are also protected from unauthorized take under the MBTA but can be removed pursuant to the Act through a permit from the USFWS. All WS' activities conducted to manage damage caused by herring gulls and to reduce threats to human safety have occurred under a permit from the USFWS pursuant to the MBTA.

From 2009 through 2013, the annual removal of herring gulls by all entities in Maine has averaged 537 gulls or 1.2% of the population estimate of 21,488 breeding pairs. The PBR model for herring gulls in BCR 14 and BCR 30 estimates that nearly 16,725 herring gulls can be removed annually with no adverse effect on the current population (Table 2). The highest reported removal from all known entities (809 in 2012) has not exceeded 5% of the 16,725 herring gulls that may be removed under the PBR model. Removal of 600 herring gulls annually would represent 3.6% of the 16,725 gulls that may be removed under the PBR model. Combined with highest known removal from other entities, the cumulative removal would only represent 8.4% of the PBR allowable removal. Based on the best available information, WS' potential

direct and cumulative impacts to populations of herring gulls are expected to be insignificant to their overall viability and reproductive success. This determination is based on population trends and the limited take proposed when compared to the estimated population. The take of herring gulls would only occur at levels authorized by the USFWS which ensures cumulative take is considered as part of population management objectives for these birds. No indirect impacts to herring gull populations were identified.

Impacts due to nest removal and destruction should have little adverse impact on the herring gull population. Nest destruction methods are considered non-lethal when conducted before the development of an embryo. Additionally, herring gulls are a long lived species that have the ability to identify areas with regular human disturbance and low reproductive success, relocating and nesting elsewhere when confronted with repeated nest failure. Although there may be reduced fecundity for the individuals affected by nest destruction, this activity has no long term effect on breeding adult herring gulls. The destruction of up to 600 herring gull nests and 1,800 eggs annually by WS under the proposed action would occur in localized areas where nesting takes place and would not reach a level where adverse effects on herring gull populations would occur. As with the lethal take of gulls, the take of nests must be authorized by the USFWS. Therefore, the number of nests taken by WS annually would occur at the discretion of the USFWS.

Ring-billed Gull Population Impact Analysis (Direct, Indirect, and Cumulative)

Regional populations of ring-billed gulls have increased at a rate or 8%-11% per year since 1976, with a regional breeding population of 40,844 gulls in 13 colonies reported in the 1990s (MANEM Regional Waterbird Plan 2006). Similar rates of increase were observed for populations of ring-billed gulls in Maine (Greenlaw and Sheehan 2003). The overall regional population of ring-billed gulls in BCR 14 and BCR 30 is estimated at 54,000 (see Table 1). No breeding population estimates are currently available for Maine; however, the MDIFW reported that populations of ring-billed gulls were increasing as of 2007 as a result of expanding breeding populations in the St. Lawrence River and Lake Champlain in Vermont but updated information is not available (B. Allen, MDIFW, pers. comm. 2014). Ring-billed gulls do have a year round presence and can be observed throughout much of the state. In 1984, the population of ring-billed gulls in the Great Lakes region was estimated at approximately 648,000 pairs (Blokpoel and Tessier 1986). Blokpoel and Tessier (1992) found that the nesting population of ring-billed gulls in the Canadian portion of the lower Great Lakes system increased from 56,000 pairs to 283,000 pairs from 1976-1990.

Ring-billed gulls are considered a species of lowest concern in BCR 14 which encompasses most of the State of Maine (MANEM Regional Waterbird Plan 2006). Almost 41,000 ring-billed gulls are believed to breed in BCR 14. CBC data from 1966-2013 shows an increasing population trend for wintering populations of ring-billed gulls throughout the state (National Audubon Society 2010). The Breeding Bird Survey (BBS) has shown an increasing trend in ring-billed gull populations in Maine since 1966, estimated at 11.36% annually (Sauer et al. 2014). In the eastern BBS region, the ring-billed gull populations are also showing an increasing annual trend estimated at 4.36% since 1966 with the trend across all routes in the U.S. estimated to be increasing at 1.45% annually (Sauer et al. 2014).

The number of ring-billed gulls taken or dispersed by WS in Maine and the total number of gulls taken by all entities in Maine to alleviate damage and threats associated with these birds are shown in Table 5. From FY 2009 through FY 2013, WS lethally removed an average of 254 ring-billed gulls and used non-lethal methods to disperse 6,218 ring-billed gulls in Maine (Table 5). A total of 992 ring-billed gulls (198 gulls per year, on average) were taken by all entities to alleviate damage and threats associated with these birds occurring in the Maine from 2009 to 2013 (P.Carota, USFWS, pers. comm. 2014).

Table 5 – Number of ring-billed gulls addressed from 2009 to 2013.

Year	Dispersed by WS[1]	Take under Depredation Permits			
		Adults		Nests	
		WS' Take[1]	Total Take by All Entities[2]	WS' Take[1]	Total Take by All Entities[2]
2009	5,997	234	182	0	0
2010	6,797	236	208	0	0
2011	3,520	254	361	0	0
2012	8,399	338	177	0	0
2013	6,378	209	64	0	0
TOTAL	**31,091**	**1,271**	**992**	**0**	**0**

[1]Dispersal or take in Maine, data reported by federal fiscal year
[2]Take data reported by calendar year; includes WS' take

To address increased requests for assistance to manage damage and threats associated with ring-billed gulls, WS proposes that up to 500 ring-billed gulls, 500 nests, and 1,500 eggs could be removed annually by WS to alleviate damage and threats, which includes removal of up to 50 ring-billed gulls during activities to protect nesting shorebirds as addressed in the Nest Predator EA (USDA 2013). The increased level of removal analyzed is in anticipation of requests to protect threatened and endangered nesting bird colonies, to address damage and threats of damage occurring at airports where they pose a strike hazard to aircraft, and at drinking water sources where they feed and loaf causing a disease threat to human health and safety from excessive accumulations of droppings. This increased level of take is also in anticipation of damage caused to buildings by nesting and loafing gulls.

Removal of 500 ring-billed gulls would represent 0.9% of the estimated ring-billed gull population in Maine based on the estimated regional population of 54,000 birds. Ring-billed gulls are also protected from take under the MBTA but can be taken pursuant to the Act through a permit from the USFWS. All WS' activities conducted to manage damage caused by ring-billed gulls and to reduce threats to human safety have occurred under a permit from the USFWS pursuant to the MBTA.

From 2009 through 2013, the annual removal of ring-billed gulls by all entities in Maine has averaged 198 gulls or 0.4% of the population estimate of 54,000 birds. The PBR model predicts ring-billed gulls in BCR 14 and BCR 30 could sustain a harvest of 3,065 individuals and maintain current population levels (Table 2). The highest reported removal from all known entities (361 in 2011) represents 12% of the 3,065 ring-billed gulls that may be removed under

the PBR model while maintaining current population levels. Removal of 500 ring-billed gulls annually would represent 16% of the 3,065 ring-billed gulls that may be removed under the PBR model while maintaining current population levels. Cumulatively, all removal would represent only 28% of the PBR model. Based on the best available information, WS' potential direct and cumulative impacts to populations of ring-billed gulls are expected to be insignificant to their overall viability and reproductive success. This determination is based on population trends and the limited take proposed when compared to the estimated population. The take of ring-billed gulls would only occur at levels authorized by the USFWS which ensures cumulative take is considered as part of population management objectives for these birds. No indirect impacts to ring-billed gull populations were identified.

Impacts due to nest removal and destruction should have little adverse impact on the ring-billed gull population. Nest destruction methods are considered non-lethal when conducted before the development of an embryo. Additionally, ring-billed gulls are a long lived species that have the ability to identify areas with regular human disturbance and low reproductive success, relocating and nesting elsewhere when confronted with repeated nest failure. Although there may be reduced fecundity for the individuals affected by nest destruction, this activity has no long term effect on breeding adult ring-billed gulls. The destruction of up to 500 ring-billed gull nests and 1,500 eggs annually by WS under the proposed action would occur in localized areas where nesting takes place and would not reach a level where adverse effects on ring-billed gull populations would occur. As with the lethal take of gulls, the take of nests must be authorized by the USFWS. Therefore, the number of nests taken by WS annually would occur at the discretion of the USFWS.

Great black-backed Gull Population Impact Analysis (Direct, Indirect, and Cumulative)

The population of great black-backed gulls in the southern New England and Mid-Atlantic Regions is approximately 28,000 breeding pairs (MANEM Regional Waterbird Plan 2006). Great black-backed gulls have increased about 39% across the entire 13 northeast state region from the 1970s through the 1990s (MANEM Regional Waterbird Plan 2006). In the United States, great black-backed gulls breeding populations have increased 109% from the 1970s to 1990s (MANEM Regional Waterbird Plan 2006). Canadian Wildlife Service reports that the population figures for the great black-backed gull populations in the Northeast (*i.e.*, along the St. Lawrence River) have increased in the last twenty years (Canadian Wildlife Service 2002). The statewide population of breeding great black-backed gulls has increased over the past 20 years in Maine. In 1984, the statewide population of great black-backed gulls was estimated at 11,500 breeding pairs (Good 1998). Currently, the MDIFW estimates the number of breeding pairs at approximately 6,934 on 191 coastal islands for the State of Maine (B. Allen, MDIFW, pers. comm. 2014).

CBC data gathered in Maine from 1966-2013 shows a decreasing population trend for wintering populations of great black-backed gull throughout the state (National Audubon Society 2010). BBS data indicates a declining population trend for great black-backed gulls breeding in Maine estimated at -8.28% and a declining trend in the Eastern Region of the BBS at a rate of -2.66% annually since 1966 (Sauer et al. 2014). Across all routes in the United States, BBS data indicates populations are increasing at an estimated rate of 0.16% annually since 1966 with similar increasing estimates for the New England/Mid-Atlantic coast BBS region estimated at

2.87% (Sauer et al. 2014).

The number of great black-backed gulls taken or dispersed by WS in Maine and the total number of gulls taken by all entities in Maine to alleviate damage and threats associated with these birds are shown in Table 6. From 2009 through 2013, WS lethally removed an average of 15 great black-backed gulls and used non-lethal methods to disperse 122 gulls in Maine (Table 6). A total of 2,302 great black-backed gulls (460 gulls per year, on average) were removed by all entities to alleviate damage and threats associated with these birds occurring in the Maine from 2009 to 2013 (P.Carota, USFWS, pers. comm. 2014).

Table 6 – Number of great black-backed gulls addressed from 2009 to 2013.

Year	Dispersed by WS[1]	Take under Depredation Permits			
		Adults		Nests	
		WS' Take[1]	Total Take by All Entities[2]	WS' Take[1]	Total Take by All Entities[2]
2009	0	16	332	0	280
2010	200	37	618	0	502
2011	145	8	460	0	417
2012	95	10	465	0	423
2013	170	3	427	0	331
TOTAL	**610**	**74**	**2,302**	**0**	**1,953**

[1]Dispersal or take in Maine, data reported by federal fiscal year
[2]Take data reported by calendar year; includes WS' take

To address increased requests for assistance to manage damage and threats associated with great black-backed gulls, WS proposes that up to 600 great black-backed gulls, 600 nests, and 1,800 eggs could be removed annually by WS to alleviate damage and threats, which includes removal of up to 100 great black-backed gulls and 50 nests during activities to protect nesting shorebirds as addressed in the Nest Predator EA (USDA 2013). The increased level of removal analyzed is in anticipation of requests to protect threatened and endangered nesting bird colonies, to address damage and threats of damage occurring at airports where they pose a strike hazard to aircraft, and at drinking water sources where they feed and loaf causing a disease threat to human health and safety from excessive accumulations of droppings.

Removal of 600 great black-backed gulls would represent 4.3% of the estimated great black-backed gull population in Maine based on 13,868 breeding individuals. Great black-backed gulls are also protected from take under the MBTA but can be taken pursuant to the Act through a permit from the USFWS. All WS' activities conducted to manage damage caused by great black-backed gulls and to reduce threats to human safety have occurred under a permit from the USFWS pursuant to the MBTA.

From 2009 through 2013, the annual removal of great black-backed gulls by all entities in Maine has averaged 460 gulls or 3.3% of the population estimate of 13,868 breeding pairs. The PBR model for great black-backed gulls in BCR 14 and BCR 30 estimates that nearly 11,234 great black-backed gulls can be removed annually with no adverse effect on the current population (Table 2). The highest reported take from all known entities (618 in 2010) would represent 5.5%

of the 11,234 great black-backed gulls that may be removed under the PBR model. Removal of 600 great black-backed gulls annually would represent 5.3% of the 11,234 gulls that may be taken under the PBR model. Cumulatively, the combined removal would represent 10.8% of the PBR model. Based on the best available information, WS' potential direct and cumulative impacts to populations of great black-backed gulls are expected to be insignificant to their overall viability and reproductive success. This determination is based on population trends and the limited take proposed when compared to the estimated population. The take of great black-backed gulls would only occur at levels authorized by the USFWS which ensures cumulative take is considered as part of population management objectives for these birds. No indirect impacts to great black-back gull populations were identified.

Impacts due to nest removal and destruction should have little adverse impact on the great black-backed gull population. Nest destruction methods are considered non-lethal when conducted before the development of an embryo. Additionally, great black-backed gulls are a long lived species that have the ability to identify areas with regular human disturbance and low reproductive success, relocating and nesting elsewhere when confronted with repeated nest failure. Although there may be reduced fecundity for the individuals affected by nest destruction, this activity has no long term effect on breeding adult great black-backed gulls. The destruction of up to 600 great black-backed gull nests and 1,800 eggs annually by WS under the proposed action would occur in localized areas where nesting takes place and would not reach a level where adverse effects on great black-backed gull populations would occur. As with the lethal take of gulls, the take of nests must be authorized by the USFWS. Therefore, the number of nests taken by WS annually would occur at the discretion of the USFWS.

Laughing Gull Population Impact Analysis (Direct, Indirect, and Cumulative)

Laughing gulls can be found nesting along the coastal areas of BCR 14 and BCR 30 with most breeding colonies occurring in BCR 14 (MANEM Regional Waterbird Plan 2006). Over 200,000 laughing gulls nest along the coastal areas in BCR 30 and have been given a conservation rank of lowest concern (MANEM Regional Waterbird Plan 2006). In BCR 14, nesting laughing gulls are estimated at 2,704 gulls and have also been given a conservation rank of lowest concern (MANEM Regional Waterbird Plan 2006). The breeding population of laughing gulls in the 1970s was estimated at 129,768 laughing gulls in 63 colonies. In the 1990s, the breeding population had increased to 205,348 laughing gulls in 275 colonies which represented a 58% increase in regional abundance (MANEM Regional Waterbird Plan 2006).

BBS trend data for laughing gulls in the Eastern BBS Region shows an increasing trend estimated at 3.21% annually since 1966 (Sauer et al. 2014). In the New England/Mid-Atlantic region, BBS trend data shows an increasing trend estimated at 5.12% annually since 1966 (Sauer et al. 2014). No BBS data in currently available for Maine (Sauer et al. 2014). CBC data for laughing gulls observed overwintering in the State has shown a relatively stable trend since 1966 (National Audubon Society 2010). As of 2014, the MDIFW estimated the number of breeding pairs at approximately 3,183 on three islands in the State of Maine (B. Allen, MDIFW, pers. comm. 2014).

The number of laughing gulls removed or dispersed by WS in Maine and the total number of

gulls removed by all entities in Maine to alleviate damage and threats associated with these birds are shown in Table 7. From 2009 through 2013, WS removed 215 laughing gulls for the protection of roseate terns. A total of 12,735 laughing gulls (2,547 gulls per year, on average) were removed by all entities to alleviate damage and threats associated with these birds occurring in the Maine from 2009 to 2013 (P.Carota, USFWS, pers. comm. 2014).

Table 7 – Number of laughing gulls addressed from 2009 to 2013.

Year	Dispersed by WS[1]	Take under Depredation Permits			
		Adults		Nests	
		WS' Take[1]	Total Take by All Entities[2]	WS' Take[1]	Total Take by All Entities[2]
2009	0	0	5,187	0	4,439
2010	0	0	3,007	0	2,973
2011	0	0	3,109	0	2,840
2012	0	0	749	0	2,649
2013	0	215	683	0	0
TOTAL	**0**	**215**	**12,735**	**0**	**12,901**

[1]Dispersal or take in Maine, data reported by federal fiscal year
[2]Take data reported by calendar year; includes WS' take

To address increased requests for assistance to manage damage and threats associated with laughing gulls, WS proposes that up to 750 laughing gulls, 150 nests, and 450 eggs could be removed annually by WS to alleviate damage and threats, which includes removal of up to 700 laughing gulls and 100 nests during activities to protect nesting shorebirds as addressed in the Nest Predator EA (USDA 2013). The increased level of removal analyzed is in anticipation of requests to protect threatened and endangered nesting bird colonies and to address damage and threats of damage occurring at airports where they pose a strike hazard to aircraft.

Removal of 750 laughing gulls would represent 12% of the estimated laughing gull population in Maine based on 3,183 breeding pairs. Since current surveys for colonial nesting gulls do not account for non-breeding gulls, the number of gulls present in the state during the breeding season is likely higher; therefore, the removal of laughing gulls is likely a smaller percentage of the actual population present in the state during the breeding season. All WS' activities conducted to manage damage caused by laughing gulls and to reduce threats to human safety have occurred under a permit from the USFWS pursuant to the MBTA.

From 2009 through 2013, the annual removal of laughing gulls by all entities in Maine has averaged 2,547 gulls. The PBR model for laughing gulls in BCR 14 and BCR 30 estimates that nearly 15,000 laughing gulls can be removed annually with no adverse effect on the current population (Table 2). The highest reported take from all known entities (5,187 in 2009) would represent 34.6% of the 15,000 laughing gulls that may be removed under the PBR model. Removal of 750 laughing gulls annually would represent 5 % of the 15,000 gulls that may be taken under the PBR model. Cumulatively, the combined removal by all entities would represent 39.6% of the PBR model. Based on the best available information, WS' potential direct and cumulative impacts to populations of laughing gulls are expected to be insignificant to their overall viability and reproductive success. This determination is based on population trends and

the limited take proposed when compared to the estimated population. The take of laughing gulls would only occur at levels authorized by the USFWS which ensures cumulative take is considered as part of population management objectives for these birds. No indirect impacts to laughing gull populations were identified.

Impacts due to nest removal and destruction should have little adverse impact on the laughing gull population. Nest destruction methods are considered non-lethal when conducted before the development of an embryo. Additionally, laughing gulls are a long lived species that have the ability to identify areas with regular human disturbance and low reproductive success, relocating and nesting elsewhere when confronted with repeated nest failure. Although there may be reduced fecundity for the individuals affected by nest destruction, this activity has no long term effect on breeding adult laughing gulls. The destruction of up to 150 laughing gull nests and 450 eggs annually by WS under the proposed action would occur in localized areas where nesting takes place and would not reach a level where adverse effects on laughing gull populations would occur. As with the lethal take of gulls, the take of nests must be authorized by the USFWS. Therefore, the number of nests taken by WS annually would occur at the discretion of the USFWS.

Snowy Owl Population Impact Analysis (Direct, Indirect, and Cumulative)

Population and trend data for snowy owls (*Bubo scandiacus*) is limited and long-term data is lacking (Parmalee et al. 1992). Manning et al. (1956) estimated 15,000 to 20,000 owls in the Canadian Arctic on Banks Island during a reproductive high, and 2,000 owls on a reproductive low. This estimate was determined by multiplying the number of individuals observed per hour by a figure related to the conspicuousness of the species (Parmalee et al. 1992). However, due to the conspicuousness of the snowy owl, there are more accurate methods of attaining a population estimate for the species, such as aerial reconnaissance (Parmalee 1992).

The number of snowy owls observed during the Christmas Bird Count (CBC) across all areas surveyed in the United States has shown a variable trend over the past 20 years (National Audubon Society 2010). The number of snowy owls observed during the CBC in Maine has also shown a variable trend, with owls observed infrequently and in low numbers (National Audubon Society 2010). There are no breeding or year-round populations of snowy owls within Maine.

WS anticipates an increased level of requests to address damage and threats of damage occurring at airports where they pose a strike hazard to aircraft where the open habitat provides ideal wintering areas for snowy owls. WS proposes to use bow nets, bal-chatri traps, Swedish Goshawk traps and/or pole traps to capture up to 50 snowy owls. Once live-captured, the owls would be placed in appropriately sized crates and transported by WS' employees to appropriate habitat and released. All live-captured snowy owls in traps will be translocated to an area at least 20 miles away from the capture location. In addition, all snowy owls captured will be leg-banded for identification purposes using United States Geological Survey approved bands appropriate for the species. Fair et al. (2010) stated "[w]*hen appropriate* [leg] *band sizes are used, the occurrence and rate of adverse effects on the subjects is ordinarily very low*". Therefore, WS does not expect the use of appropriately sized leg bands to indirectly affect snowy owls. Based on the limited relocation and the permitting of the capture and relocation by the

USFWS, WS' translocation of up to 50 snowy owls would not adversely affect snowy owl populations.

Between FY 2009 and 2013, WS has not captured any snowy owls in Maine. A total of two snowy owls have been removed by USFWS permit by all entities in Maine to alleviate damage and threats associated with them from 2009 through 2013 (P.Carota, USFWS, pers. comm. 2014).

The number of individuals of snowy owls that may be affected by WS is expected to have no direct or cumulative impacts on the overall numbers of winter migrants in Maine. Non-lethal methods are generally regarded as having minimal impacts on overall populations of wildlife since those species are unharmed. The limited translocation that could occur to alleviate aircraft strikes would not reach a magnitude that would cause adverse effects to the snowy owl population.

Rough-legged Hawk Population Impact Analysis (Direct, Indirect, and Cumulative)

No comprehensive estimates of population size on breeding grounds or wintering areas exists for rough-legged hawks (Bechard and Swem 2002). However, this hawk is widespread and common in arctic tundra regions across North America, Europe, and Asia and is thought to be one of the most abundant species of raptors in the world (Bechard and Swem 2002, Palmer 1988). Also, there is no evidence of any changes in trends in North American breeding populations (Bechard and Swem 2002, Palmer 1988). The Partners in Flight Science Committee estimates a North American population of 300,000 rough-legged hawks (Partners in Flight 2013). The open habitat of airports provides ideal wintering areas for rough-legged hawks in Maine; however, there are no breeding or year-round populations of rough-legged hawks within Maine. The number of rough-legged hawks observed during the Christmas Bird Count (CBC) across all areas surveyed in the United States has shown a steady trend between 1966 and 2013 (National Audubon Society 2010). There is no CBC data available for rough-legged hawks in Maine (National Audubon Society 2010).

WS anticipates an increased level of requests to address damage and threats of damage occurring at airports where they pose a strike hazard to aircraft where the open habitat provides ideal wintering areas for rough-legged hawks. WS proposes to use bow nets, bal-chatri traps, Swedish Goshawk traps and/or pole traps to capture up to 20 rough-legged hawks. Once live-captured, the hawks would be placed in appropriately sized crates and transported by WS' employees to appropriate habitat and released. All live-captured rough-legged hawks in traps will be translocated to an area at least 20 miles away from the capture location. In addition, all rough-legged hawks captured will be leg-banded for identification purposes using United States Geological Survey approved bands appropriate for the species. Fair et al. (2010) stated "[w]*hen appropriate* [leg] *band sizes are used, the occurrence and rate of adverse effects on the subjects is ordinarily very low*". Therefore, WS does not expect the use of appropriately sized leg bands to indirectly affect rough-legged hawks. Based on the limited relocation and the permitting of the capture and relocation by the USFWS, WS' translocation of up to 20 rough-legged hawks would not adversely affect rough-legged hawk populations.

Between FY 2009 and 2013, WS has not captured any rough-legged hawks. No rough-legged hawks have been removed by USFWS permit from any other entities in Maine to alleviate damage and threats associated with them from 2009 through 2013 (P.Carota, USFWS, pers. comm. 2014).

The number of individuals of rough-legged hawks that may be affected by WS is expected to have no direct and cumulative impacts on the overall numbers of winter migrants in Maine. Non-lethal methods are generally regarded as having minimal impacts on overall populations of wildlife since those species are unharmed. The limited translocation that could occur to alleviate aircraft strikes would not reach a magnitude that would cause adverse effects to the rough-legged hawk population.

Summary

Evaluation of WS' activities relative to wildlife populations indicated that program activities will likely have no cumulative adverse effects on populations in Maine. 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.

Effects on Non-target Species Population Including Threatened or Endangered Species

The issue of non-target species effects, including effects on threatened and endangered 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' minimization measures and standard operating procedures 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.

The lethal take of non-targets from using those methods described in the EA is unlikely with take never reaching a magnitude that a negative impact on populations would occur. Any potential non-targets live-captured using non-lethal methods would be handled in such a manner as to ensure the survivability of the animal when released. The use of firearms is selective for target species since animals are identified prior to application; therefore, no adverse impacts are anticipated from use of this method. The use of chemical methods, when used according to label directions, poses minimal hazards to non-target wildlife (USDA 2013).

Threatened and Endangered Species

In the EA, WS determined that the proposed bird damage management activities would have no effect on state or federally listed species. WS has not taken, captured or hazed any species listed by the USFWS during gull damage management activities. Therefore, the conclusions in the EA regarding impacts of the BDM program on T&E species are accurate and remain valid.

Impacts on Human Health and Safety

Management activities conducted by WS from FY 2009 through FY 2013 did not result in any injuries or illness to any members of the public or to WS' personnel. No injuries or illness from WS' activities were reported to WS since FY 2009. WS' program activities had a positive impact in those situations that reduced the risks of potential injury, illness, and loss of human life from injurious bird species. The EA concluded that an integrated approach to wildlife damage management had the greatest potential of successfully reducing potential risks to human health and safety.

Even though the number of gulls to be removed could increase, the proposed increase in removal of some gull species would allow WS to continue to provide effective assistance in reducing risks to human health and safety from gulls. If the current limits are maintained, WS may have to use methods that are less than optimal to reduce risks to human health and safety from gulls. Based on the analysis in the EA and the above information, the proposed action will not adversely impact human health and safety and will better enable WS to respond to the need to protect human health and safety from risks associated with birds.

Effectiveness of Damage Management Methods

The 2013 EA determined that the most effective approach to solving wildlife damage would be to implement an adaptive approach, which may call for the use of several management methods simultaneously or sequentially (Courchamp et al. 2003). The proposed action in this supplement remained unchanged, and therefore, the 2013 EA's conclusion is still valid.

Effects on Aesthetic Values

Information in this supplement indicates that WS' removal of gull species have been minimal and of a low magnitude when compared to the populations of those species. WS' removal has not reached a magnitude that would severely limit the ability to view and enjoy birds. Only those birds identified as causing damage were targeted by WS during damage management activities and only after a request for such action was received. WS addressed most birds using non-lethal harassment methods to alleviate damage and threats which disperses birds from those areas. Similarly, the use of lethal methods removes those birds associated with the damage. However, birds can be viewed outside the area where damage management activities were conducted if a reasonable effort is made to locate those birds outside of the damage management area. WS receives requests to conduct damage management activities on only a small portion of the land area in Maine. Therefore, activities are not conducted over large areas that would greatly limit the aesthetic value of birds.

Some people who routinely view or feed individual birds are disturbed by removal of such animals under the current program and would also be disturbed by the proposed increases in the lethal take of birds. However, lethal control actions would still generally be restricted to local sites and to small, insubstantial percentages of overall populations. Therefore, the species subjected to limited lethal control actions would remain common and abundant and would therefore continue to remain available for viewing by persons with that interest.

The fecal contamination associated with high numbers of birds at parks and other public and private property is considered by some to be an adverse impact on their aesthetic enjoyment of these sites. The proposed increases in the maximum number of birds that could be taken would enable WS to continue to provide effective GDM assistance. If the current limits are maintained, WS may have to use methods that are less than optimal to resolve damage management situations that may occur after the yearly limit on removal has been reached.

Humaneness and Animal Welfare Concerns of Lethal Methods Used by WS

Methods used in gull damage management activities and their potential impacts on humaneness and animal welfare are no different than from those analyzed in the 2013 EA. All methods employed by WS to alleviate gull damage are discussed in the 2013 EA. WS continued to employ methods as humanely as possible to minimize distress. Therefore, the analyses of the humaneness of methods used by WS to manage damage and threats caused by birds remains valid and as analyzed in the 2013 EA.

Summary

No significant cumulative environmental impacts are expected from activities considered under the supplement to the EA. Likewise, no significant cumulative impacts have been identified from the implementation of the proposed action in the EA since 2009. 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 Maine 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

FEDERAL LIST OF THREATENED AND ENDANGERED SPECIES IN THE STATE OF MAINE

Animals -- 18 listings

Status	***Species listed in this state and that occur in this state***
E	Beetle, American burying (*Nicrophorus americanus*)
E	Blue, Karner (*Lycaeides Melissa samuelis*)
E	Curlew, Eskimo (*Numenius borealis*)
T	Lynx, Canada (*Lynx Canadensis*)
T	Plover, piping (*Charadrius melodus*)
E	Puma (=cougar), eastern (*Puma (=Felis) concolor couguar*)
E	Ridley, Atlantic (*Lepidochelys kempi*)
E	Salmon, Atlantic (*Salmo salar*)
E	Sea turtle, leatherback (*Dermochelys coriacea*)
T	Sea turtle, loggerhead (*Caretta caretta*)
E	Sturgeon, shortnose (*Acipenser brevirostrum*)
E	Tern, roseate (*Sterna dougallii dougallii*)
E	Whale, finback (*Balaenoptera physalus*)
E	Whale, Humpback (*Megaptera novaeangilae*)
E	Whale, northern right (*Balaena glacialis (incl. australis)*)
E	Whale, Sei (*Balaenoptera borealis*)
E	Whale, Sperm (*Physeter catodon*)
E	Wolf, gray (*Canis lupus*)

Plants -- 3 listings

Status	***Species listed in this state and that occur in this state***
E	Lousewort, Furbish's (*Pedicularis furbishiae*)

T Pogonia, small whorled (*Isotria medeoloides*)

T Orchid, Prairie white-fringed (*Platanthera leucophaea*)

APPENDIX B

STATE LIST OF THREATENED AND ENDANGERED SPECIES IN THE STATE OF MAINE

47 Listings

Status	***Birds***
E	Bittern, Least (*Lxobrychus exilis*)
T	Cormorant, Great (*Phalacrocorax carbo*) (Breeding population only)
T	Duck, Harlequin (*Histrionicus histrionicus*)
E	Eagle, Golden (*Aquila chrysaetos*)
E	Falcon, Peregrine (*Falco peregrinus*) breeding population only
T	Goldeneye, Barrow's (*Buchephala islandica*)
T	Heron, Black-crowned Night (*Nycticorax nycticorax*)
T	Moorhen, Common (*Gallinula chloropus*)
T	Owl, Short-eared (*Asio flammeus*) (breeding population only)
E	Pipit, American (*Anthus rubescens*) (breeding population only)
E	Plover, Piping (*Charadrius melodus*)
T	Puffin, Atlantic (*Fratercula arctica*)
T	Razorbill (*Alca torda*)
T	Sandpiper, Upland (*Bartramia longicauda*)
E	Sparrow, Grasshopper (*Ammodramus savannarum*)
T	Tern, Arctic (*Sterna paradisaea*)
E	Tern, Black (*Chilidonias niger*)
E	Tern, Least (*Sterna antillarum*)
E	Tern, Roseate (*Sterna dougallii*)
E	Wren, Sedge (*Cistothorus platensis*)
Status	***Reptiles and Amphibians***
T	Loggerhead (*Caretta caretta*)

E	Racer, Black (*Coluber constrictor*)
E	Turtle, Blandings (*Emys blandingii*)
E	Turtle, Box (*Terrapene Carolina*)
T	Turtle, Spotted (*Clemmys guttata*)
Status	***Mammals***
E	Cottontail, New England (*Sylvilagus transitionalis*)
T	Lemming, Northen Bog (*Synaptomys borealis*)
Status	***Fish***
T	Darter, Swamp (Etheostoma fusiforme)
E	Pickerel, Redfin (*Esox americanus americanus*)
Status	***Mollusks***
T	Floater, Brook (*Alasmidonta varicosa*)
T	Lampmussel, Yellow (*Lampsilis cariosa*)
T	Mucket, Tidewater (*Leptodea ochracea*)
Status	***Insects***
E	Arctic, Katahdin (*Oeneis polixenes katahdin*)
T	Boghaunter, Ringed (*Williamsonia lintneri*)
E	Clubtail, Rapids (*Gomphus quadricolor*)
E	Copper, Clayton's (*Lycaena dorcas claytoni*)
T	Duskywing, Sleepy (*Erynnis brizo*)
T	Fritillary, Purple Lesser (*Boloria chariclea grandis*)
E	Hairstreak, Edwards (*Satyrium edwardsii*)
E	Hairstreak, Hessel's (*Callophrys hesseli*)
E	Hairstreak, Juniper (*Callophrys gryneus*)
E	Mayfly, Roaring Brook (*Epeorus frisoni*)
T	Mayfly, Tomah (*Siphlonisca aerodromia*)
T	Moth, Twilight (*Lycia rachelae*)

T Snaketail, Boreal (*Ophiogomphus colubrinus*)

T Snaketail, Pygmy (*Ophiogomphus howei*)

T Zanclognatha, Pine Barrens (*Zanclognatha martha*)