

**DECISION
AND
FINDING OF NO SIGNIFICANT IMPACT
FOR THE ENVIRONMENTAL ASSESSMENT:**

MUTE SWAN DAMAGE MANAGEMENT IN MICHIGAN

INTRODUCTION

Mute Swans (*Cygnus olor*) are appreciated by many people for their beauty, social behavior (e.g., long-term pair bonds) and intrinsic value as living beings (Gelston and Wood 1982, Swans of Stanley Park 2012, Wisconsin Swan Lovers 2009). Unfortunately, Mute Swans can damage property, agriculture, and natural resources (Atlantic Flyway Council 2003, MDNR 2002, 2012a, Craves and Suskow 2010). Mute Swans can also be a hazard to human health and safety because of aggressive behavior by territorial or food-habituated birds, and fecal contamination of water sources and areas with high recreational use. Their large size also makes them hazardous to aircraft. The United States Department of Agriculture, Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS); the United States Department of the Interior, Fish and Wildlife Service (USFWS), Shiawassee National Wildlife Refuge and Detroit River International Wildlife Refuge; and the USDA Forest Service (USFS), Huron-Manistee National Forests prepared an Environmental Assessment (EA) evaluating ways by which the agencies may work together to resolve conflicts with Mute Swans in Michigan. The analysis for the EA was prepared in consultation with the Michigan Department of Natural Resources (MDNR) Wildlife Division and Parks and Recreation Division, Grand Traverse Band of Ottawa and Chippewa Indians, Little Traverse Bay Bands of Odawa Indians, Match-E-Be-Nash-She-Wish Band of Pottawatomi Indians, and the Great Lakes Indian Fish and Wildlife Commission. This document is the record of WS' management decision based on the analysis in the EA and agency response to public comments.

The EA documented the need for Mute Swan Damage Management (MSDM) in Michigan and assessed potential impacts on the human environment from the various alternatives for responding to damage problems in Michigan. The analysis considered current and future MSDM actions by WS, USFWS, USFS, MDNR, and the Tribes wherever they might be requested or needed within the State of Michigan. After reviewing the analysis in the EA and agency response to public comments (Appendix A), WS is selecting the proposed alternative, "Alternative 1: Integrated Wildlife Damage Management Program". Wildlife Services believes that the selected management alternative will allow for the effective implementation of MSDM and will reduce damage by and conflicts with Mute Swans in Michigan. This management strategy will also be consistent with the MDNR Mute Swan Management and Control Program Policy and Procedures and provide the best potential for reaching the MDNR established Mute Swan population management goals (MDNR 2012). It will also provide the greatest protections for native habitat and waterfowl species and human health and safety. WS MSDM will be conducted in accordance with all applicable federal, state and local laws and regulations.

WS was the lead agency in the preparation of the EA, and is the Federal program authorized by law to reduce damage caused by wildlife (the Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C. 426-426b) as amended, and the Act of December 22, 1987 (101 Stat. 1329-331, 7 U.S.C. 426c)). Wildlife damage management is the alleviation of damage or other problems caused by or related to the presence of wildlife, and is recognized as an integral part of wildlife management (The Wildlife Society 1992). WS responds to requests for assistance from individuals, organizations and agencies experiencing damage caused by wildlife. Ordinarily, according to APHIS procedures implementing the National Environmental Policy Act (NEPA), individual wildlife damage management actions may be categorically

excluded (7 CFR 372.5(c), 60 Fed. Reg. 6000-6003, 1995). However, WS and the cooperating agencies decided to prepare the EA to assist in planning MSDM activities and to clearly communicate with the public the analysis of cumulative effects for a number of issues of concern in relation to alternative means of meeting the need for action.

COOPERATING AGENCIES

U.S. Department of the Interior, Fish and Wildlife Service (USFWS). The USFWS, including the Shiawassee National Wildlife Refuge and the Detroit River International Wildlife Refuge, was a cooperating agency in the preparation of this EA. The mission of the USFWS is: “Working with others to conserve, protect, and enhance fish, wildlife, plants and their habitats for the continuing benefits of the American people”. While some of the USFWS’s responsibilities are shared with other Federal, State, tribal, and local entities, the USFWS has special authorities in conserving migratory birds, endangered species, certain marine mammals, and nationally significant fisheries; managing the National Wildlife Refuge System; and enforcing Federal wildlife laws. The Migratory Bird Treaty Act (MBTA) gives the USFWS primary statutory authority to manage migratory bird populations in the U.S. The USFWS is also charged with implementation and enforcement of the Endangered Species Act of 1973, as amended, and with developing recovery plans for listed species. The mission of the National Wildlife Refuge System is to, “administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans”.

United States Department of the Agriculture, Forest Service (USFS). The USFS, including the Huron-Manistee National Forests, was a cooperating agency in the preparation of this EA. The mission of the USFS is: “to sustain the health, diversity, and productivity of the Nation’s forests and grasslands to meet the needs of present and future generations”. As set forth in law, the mission is to achieve quality land management under the sustainable multiple-use management concept to meet the diverse needs of people. The USFS advocates a conservation ethic in promoting the health, productivity, diversity, and beauty of forests and associated lands.

MONITORING

The Michigan WS program will monitor the implementation of the MSDM program to help ensure the cumulative impacts of WS actions are consistent with analyses and conclusions in the EA. Wildlife Services’ monitoring also determines if the analyses and determinations in the EA adequately address anticipated future program activities.

CONSISTENCY

Wildlife damage management activities conducted in Michigan are consistent with Work Plans MOUs and policies of WS, the MDNR, USFWS, and the USFS. In addition, WS completed an Informal Section 7 consultation with the USFWS regarding potential impacts of the MSDM program on threatened and endangered species. Based on the provisions and protective measures established in the EA, WS concluded the proposed action would have no adverse impact on federally-listed threatened or endangered species or may affect but was unlikely to adversely affect federally-listed species. The USFWS concurred with this determination in a letter to WS on February 22, 2012. Similarly, WS determined that the proposed action would not adversely impact and could have a beneficial impact on some state-listed

threatened and endangered species. The MDNR concurred with this determination on April 2, 2012. Review by the Michigan Department of Environmental Quality indicates that, provided all required permits are issued and complied with, the proposed action is consistent with the Michigan Coastal Zone Management Program (letter from Michigan Department of Environmental Quality to WS, July 19, 2012).

PUBLIC INVOLVEMENT

The EA was prepared and released to the public for a 30-day comment period via a legal notice placed on June 7-9, 2010 in the *Lansing State Journal*. WS also posted the EA and a notice of availability for comment on their web site http://www.aphis.usda.gov/wildlife_damage/nepa.shtml. A notification regarding the availability of the EA for public comment was also mailed directly to agencies, organizations, and individuals with probable interest in the proposed program. Fourteen comment letters were received on the EA. Responses to comments are provided in Appendix A. All letters and comments are maintained at the Wildlife Services State Office in Okemos, Michigan.

MAJOR ISSUES

The following issues were identified as important to the scope of the analysis. The EA analyzed the impacts of each MSDM alternative relative to these issues.

- I. Effects on Mute Swan Populations;
- II. Effectiveness of Mute Swan Damage Management Methods;
- III. Effects on Aesthetic Values;
- IV. Humaneness and Animal Welfare Concerns of Methods Used by WS; and
- V. Effects on Non-target Wildlife Species Populations, Including T&E Species

AFFECTED ENVIRONMENT

The proposed action may be conducted on properties held in private, local, state or federal ownership. The areas of the proposed action could include areas in and around public and private facilities and properties and at other sites where Mute Swans may loaf, feed, nest or otherwise occur. Examples of areas where MSDM activities could be conducted include, but are not necessarily limited to: lakes, ponds, rivers, swamps, marshes, communally-owned homeowner/property owner association properties, boat marinas, natural areas, national wildlife refuges (Shiawassee and Detroit River), national forests (Huron and Manistee) state wildlife management areas, and airports and surrounding areas. WS will consult the MDNR in determining high-priority sites and before undertaking MSDM activities at each site.

ALTERNATIVES THAT WERE FULLY EVALUATED

Four alternatives were developed to respond to the issues and need for action. The following is a summary of the alternatives.

Alternative 1: Integrated Wildlife Damage Management (Proposed Action/No Action)

The No Action alternative is a procedural NEPA requirement (40 CFR 1502.14(d)) and is a viable

and reasonable alternative that could be selected and serves as a baseline for comparison with the other alternatives. The No Action alternative, as defined here, is consistent with guidance from the CEQ (CEQ 1981). In this guidance, the No Action alternative for situations where there is an ongoing management program may be interpreted as "no change" from current management direction or level of management intensity.

Under this alternative, the WS program would continue the current IWDM program that responds to requests for MSDM to protect property, natural resources, and human health and safety in Michigan. The continued implementation of the IWDM approach would allow the use and recommendation of legal nonlethal and lethal techniques and methods singly or in combination, to meet requestor needs for reducing conflicts with Mute Swans (EA Appendix B). Non-lethal methods used by WS may include methods such as resource management, physical exclusion, and harassment tactics. Lethal methods used by WS may include nest and egg treatment/destruction, live capture and euthanasia, and/or shooting. In most situations, the implementation of non-lethal methods such as habitat alteration, frightening devices, and exclusion would be the responsibility of the requestor to implement. Requests for assistance may occur anywhere and anytime in Michigan. The proposed MSDM activities could be conducted on public, private and tribal property in Michigan when the property owner or manager requests assistance and/or when assistance is requested by an authorized state, federal, tribal, or local government agency, a need is confirmed, and authorization is granted by the landowner/manager. A combination of nonlethal or lethal methods for MSDM would be available for use on lands under USFWS and USFS management. All management actions would comply with applicable federal, tribal, state, and local laws.

Alternative 2: Technical Assistance Only by WS

This alternative would not allow for WS operational MSDM in Michigan. Wildlife Services would only provide technical assistance (advice) when requested. Property owners/managers, other agency personnel, or others could conduct MSDM on their own using any legal lethal or non-lethal method. Landowners/managers would be able to seek operational assistance with MSDM from other federal, state, or local agencies, or private businesses and organizations.

Currently, the sedative alpha-chloralose is only available for use by WS employees and would be unavailable for use by private individuals under this alternative. Appendix B of the EA describes a number of methods that could be employed by private individuals or other agencies after receiving technical assistance under this alternative.

Alternative 3: Only Nonlethal Methods and Egg Treatment for Mute Swan Damage Management

This alternative would require WS to only use and recommend non-lethal methods and egg treatments (destruction, oiling, addling, puncturing, chilling) to resolve Mute Swan damage problems (Appendix B). Individuals, agencies, and organizations with Mute Swan conflicts could still employ other lethal methods (e.g., shooting, capture and euthanasia) that were available to them or seek assistance from other businesses, agencies, and organizations in implementing lethal MSDM methods. Individuals seeking information on lethal MSDM methods would be referred to other sources such as the MDNR or pest control organizations.

Currently, the sedative alpha-chloralose is only available for use by WS employees. Under this alternative, WS could not use alpha-chloralose to capture Mute Swans because all swans captured

by WS would have to be euthanized, per MDNR regulation.

Alternative 4: No Federal Mute Swan Damage Management

This alternative would eliminate WS involvement in MSDM in Michigan. Wildlife Services would not provide direct operational or technical assistance, and requesters of WS services would conduct MSDM without WS input. Information on MSDM methods may be available to producers and property owners through other sources such as the MDNR, universities, or pest control organizations. The sedative alpha-chloralose is only available for use by WS employees and would not be available for use by private individuals under this alternative.

Environmental Status Quo: As defined by the NEPA implementing regulations, the “human environment shall be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment” (40 CFR 1508.14). Therefore, when a federal action agency analyzes its potential impacts on the “human environment,” it is reasonable for that agency to compare not only the effects of the federal action, but also the potential impacts that occur or could occur in the absence of the federal action by a non-federal entity. Mute Swans are managed by the MDNR and tribes without any federal oversight or protection. In accordance with applicable state regulations and policies, the MDNR has the authority to manage Mute Swans and authorize the taking of Mute Swans for damage management purposes.

Usually, when a non-federal entity (e.g., agricultural producers, municipalities, private companies, individuals, or other non-federal entity) takes a MDM action, the action is not subject to compliance with the NEPA due to the lack of federal involvement in the action. Under such circumstances, the environmental baseline or status quo must be viewed as an environment that includes those resources as they are managed or impacted by non-federal entities in the absence of the proposed federal action. In this case, the MDNR, through establishment of the Mute Swan Management and Control Policy and Procedures, has committed to Mute Swan damage management and reduction of the state Mute Swan population. The MDNR is capable of achieving its management objectives without the involvement of WS, and other entities in the state can receive authorization to use lethal MDM methods from the MDNR. Consequently, WS’ decision-making ability is limited to determining if the program will aid the MDNR, tribes, agencies, organizations and individuals in reducing and preventing damage by Mute Swans and the extent to which WS will participate in the existing program (i.e. which state-authorized methods to use). Under these circumstances, WS would have virtually no ability to affect the environmental status quo since the action would likely occur in the absence of WS’ direct involvement.

In some situations, certain aspects of the human environment may actually benefit more from WS’ involvement than from a decision not to assist. For example, if a cooperator believes WS has greater expertise to selectively remove Mute Swans than a non-WS entity; WS’ management activities may have less of an impact on target and non-target species than if the non-federal entity conducted the action alone. Thus, in those situations, WS’ involvement may provide some benefit to the human environment when compared to the environmental status quo in the absence of such involvement.

DECISION AND RATIONALE

I have carefully reviewed the EA prepared for this proposal and the input from the public involvement process. I believe that the issues identified in the EA and in public comments are best addressed by selecting Alternative 1 (Preferred Alternative). This alternative was selected because (1) it offers the greatest chance at maximizing effectiveness and benefits to resource owners and managers while

minimizing cumulative adverse impacts on the quality of the human environment that might result from the program's impacts on target and nontarget species populations; (2) it is consistent with federal (Executive Order 13112 – Invasive Species) and state directives and policy (MDNR 2012) pertaining to invasive species and/or Mute Swan management; (3) it presents the greatest chance of maximizing net benefits while minimizing adverse impacts to public health and safety; and (3) it offers a balanced approach to the issues of humaneness and aesthetics when all facets of these issues are considered.

FINDING OF NO SIGNIFICANT IMPACT

The analyses in the EA indicate that there will not be a significant impact, individually or cumulatively, on the quality of the human environment as a result of actions proposed. I agree with this conclusion and therefore find that an EIS need not be prepared. This determination is based on the following factors:

1. Mute Swan damage management as proposed in the EA is not regional or national in scope..
2. The proposed action would pose minimal risk to public health and safety. Risks to the public from WS methods were determined to be low in a formal risk assessment (Appendix P of USDA 1997 Revised).
3. There are no unique characteristics such as park lands, prime farm lands, wetlands, wild and scenic areas, or ecologically critical areas that would be significantly affected. Built-in mitigation measures that are part of the action agencies' standard operating procedures and adherence to laws and regulations will further ensure that the agencies' activities do not harm the environment.
4. The effects on the quality of the human environment are not highly controversial. Although there is some opposition to MSDM, this action is not highly controversial in terms of size, nature, or effect. Public controversy over Mute Swan management has been acknowledged and addressed in the EA.
5. Based on the analysis documented in the EA and the accompanying administrative file, the effects of the proposed damage management program on the human environment would not be significant. The effects of the proposed activities are not highly uncertain and do not involve unique or unknown risks.
6. The preferred alternative would not establish a precedent for any future action with significant effects. Authorizations issued by the MDNR will be reviewed annually and renewed or revised as appropriate.
7. No significant cumulative effects were identified through this assessment. The proposed action will not impact the environmental status quo for the Mute Swan population. The EA discussed cumulative effects on non-target species populations and concluded that such impacts were not significant for this or other anticipated actions to be implemented or planned within the State
8. The proposed activities would not affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places, nor would they likely cause any loss or destruction of significant scientific, cultural, or historical resources. If an individual activity with the potential to affect historic resources is planned under the selected alternative, then site-specific consultation as required by Section 106 of the NHPA would be conducted as necessary (Section 1.9.2 of EA).

9. The USFWS has determined that the proposed program would have no effect on or is not likely to adversely affect any federally-listed threatened or endangered species. This determination is based upon a February 2, 2012 informal Section 7 consultation completed by the USFWS for activities described in the EA. In addition, WS and the MDNR have determined that the proposed program will not adversely affect any Michigan state-listed threatened or endangered species.
10. The proposed action would be in compliance with all applicable Federal, State, and local laws.

Copies of the EA are available upon request from the USDA Wildlife Services Office, 2803 Jolly Road – Suite 100, Okemos, MI 48864, Phone (517) 336-1928, FAX (517) 336-1934.



Charles S. Brown, Regional Director
USDA-APHIS-WS, Eastern Region

9/28/12

Date

APPENDIX A

RESPONSES TO COMMENTS

Wildlife Services received 14 comment letters on the EA. This appendix contains issues raised in the letters and WS' response to each issue. Comments from the public are numbered and are written in bold text. The WS response follows each comment and is written in standard text. Some commenters also requested that a letter to the MDNR regarding the state Mute Swan Management and Control Program Policy and Procedures be considered for the EA. Although the letter was not directed to WS, we have included responses to the issues relevant to the EA in the responses below.

- 1. Given that most evidence suggests Mute Swans have an adverse impact on Submerged Aquatic Vegetation, you should eliminate the statement in Section 1.4 which states that additional research on the impact of Mute Swans on native ecosystems is warranted.**

As noted in the summary of data provided in Section 1.4.1, reports of Mute Swan impacts on submerged aquatic vegetation have been mixed. Although we believe sufficient data exists to warrant Mute Swan damage management for the protection of natural resources in Michigan, additional information would aid understanding and facilitate effective and efficient management.

- 2. Commenters are working with the Humane Society of the United States (HSUS) to submit revised Mute Swan Management and Control Program Policy and Procedures to the MDNR. What happens to WS actions and the EA if the MDNR switches their Mute Swan Management and Control Program Policy and Procedures? WS should not conduct lethal Mute Swan damage management until the MDNR alters their plan in accordance with the HSUS letter.**

The MDNR and the tribes have management authority for Mute Swans in Michigan. The WS program conducts MSDM actions in Michigan in accordance with applicable state and tribal authorizations and Memoranda of Understanding. The MDNR permits for MSDM are issued in accordance with state regulations and the Mute Swan Management and Control Program Policy and Procedures. If the MDNR alters their management plan, WS will review, and if needed, modify the EA or management alternative as needed in accordance with the NEPA. WS has reviewed the July 11, 2012 letter submitted to the MDNR by the HSUS and comments relevant to this analysis have been addressed in responses to comments below.

Consultation with the MDNR and a September 6, 2012 letter from the MDNR to HSUS indicates that the state does not intend to discontinue Mute Swan damage management at this time. Analysis in the EA indicates there is a need for Mute Swan damage management in Michigan. An alternative which would discontinue WS involvement in Mute Swan damage management in Michigan was considered in detail but not selected for reasons presented in the Decision.

- 3. EA does not provide sufficient evidence to justify management, harassment or killing of Mute Swans. It is not appropriate to extrapolate data on Mute Swan damage from other areas to Michigan. Swans should not be removed unless there is concrete evidence from Michigan that swans are causing damage at each management site.**

We do not agree. Need for action is established in Chapter 1 of EA Section 1.4. The EA includes data summaries and studies from freshwater systems such as MDNR (2002), Allin and Husband (2003), Bailey et al. (2008), Craves and Susko (2010) which are relevant and applicable to the situation in

Michigan. Further, issues pertaining to the amount of forage needed by Mute Swans, and the impact of concentrations of Mute Swans on areas with limited forage available for migrant and resident waterfowl (Bailey et al. 2003, Craves and Susko 2010) remain relevant no matter where the demands on resources occur. Mute Swan physiology and mechanics of foraging also remain the same across habitat types. Consequently, concerns regarding the mechanical disturbance of aquatic substrates from Mute Swan foraging are also applicable to a range of habitat types. Based on the available information, the agencies have determined there is sufficient evidence to believe high concentrations of Mutes Swans can and are adversely impact natural resources in Michigan. The MDNR management policy and procedures were developed to address current and prevent future adverse impacts on natural resources from the increasing Mute Swan population.

4. People are the real source of environmental damage, not the swans. Agencies should take responsibility for damage caused by humans and not blame it on animals.

We agree that human actions including development and pollution have resulted in substantial loss and degradation of wetland habitats and aquatic systems and associated adverse impacts on native wildlife. Unfortunately, these human actions also include intentional or unintentional introduction of non-native, invasive species such as Mute Swans, zebra mussels, and Eurasian milfoil. Information on adverse impacts of Mute Swan impacts on wetland habitats and associated species are provided in Section 1.4 of the EA. The tribes, state, federal and local agencies, private organizations and individuals work to address the impacts of all these factors on our environment including problems associated with the species we introduced. Presidential Executive Order 13112 – Invasive Species recognizes the adverse impacts invasive species can have on our environment and directs federal agencies to use their programs and authorities to prevent the spread or to control populations of invasive species that cause economic or environmental harm, or harm to human health.

5. Agency should adopt policy of tolerance and respect. No lethal methods should be used.

An alternative in which WS would only use nonlethal methods (excludes use of all lethal methods including egg treatments) was considered but not analyzed in detail for reasons presented in Section 3.3.2. The EA acknowledges that some individuals and organizations will be opposed to lethal Mute Swan management no matter what the situation and that these individuals want the agencies to teach tolerance for Mute Swans and Mute Swan activities in Section 2.3.3 and in Chapter 4 analyses of issues of humaneness and aesthetic impacts. An alternative which combines use of nonlethal methods and nest and egg treatments was considered in detail in the EA but not selected for use for reasons presented in the Decision. The MDNR has encouraged HSUS and Michigan Save Our Swans to consider developing a pilot program with the MDNR to increase the intensity and effectiveness of nonlethal management. Under the proposed alternative, WS would monitor the results of any such projects and would, where appropriate, incorporate practical and effective nonlethal strategies in its management program (See also Response 40).

6. There is a substantial problem at Detroit River where overwintering Mute Swans concentrate in areas of open water and compete with native birds that have congregated there for the same reasons. Increased use of lethal above what has already occurred is warranted based on number of swans at Detroit River. Size and feeding habits of swans leads to substantial damage to submerged aquatic vegetation which could increase risk of colonization by invasive plants.

Problem is consistent with material and information presented in Section 1.4 - Need for Action. The preferred alternative would allow for additional lethal removal of Mute Swans above levels which have occurred to date. Resources are allocated to areas prioritized by the MDNR based on number of Mute

Swans and degree of potential benefit. The Detroit River has been deemed a high priority area. However, management on the Detroit River is currently limited to areas owned by the state or USFWS, unless or until such time as landowners along the river give permission for control in the waters in front of their shoreline property.

7. If Mute Swans eat large amounts of aquatic vegetation why are we removing them instead of letting them remove invasive plants like Eurasian Milfoil for us?

Unfortunately, free-ranging Mute Swans eat a range of plant species and do not restrict their diet to non-native species or to foraging in the areas where we want them to be. When swans uproot vegetation, they disturb all vegetation types, and as the plants re-establish, invasive species such as Eurasian milfoil can out-compete native plants.

8. Money for invasive species control should be spent on Asian carp, phragmites, round gobies, zebra mussels and other species that are true threats to ecosystem.

Mute Swans are only one of many nonnative invasive species managed by the state, tribes, and federal agencies. The tribes and agencies also have programs for and support research on methods to address existing invasive species problems. For example, the Great Lakes Restoration Initiative provides funding for Great Lakes Restoration projects which include management and research on methods to address impacts of invasive plants, monitoring of the live bait trade for risks from invasive fish, rusty crayfish and round goby management to increase survival of native reef fish, and Mute Swan damage management (<http://greatlakesrestoration.us/2011epagrants.html>). The existence of other invasive species problems does not preclude work to address damage caused by Mute Swans.

9. We have not observed any adverse impacts from Mute Swans on other birds in our area. One commenter has observed Common Loons nesting within 200 feet of Mute Swans.

The agencies agree that not all Mute Swans behave aggressively toward other species. It is possible for limited numbers of swans to exist in specific locations without undue adverse impact on natural resources. However, aggression toward other waterfowl does occur (Fig. 1). Likelihood of aggression toward other species appears to be greatest during breeding season and then diminishes as cygnets mature. Unfortunately, this is the period when other waterfowl species also have specific needs for nesting habitat. The incidents are common enough and the Mute Swan population high enough that the state is concerned. Nesting areas used by Mute Swans could be available for other native species if invasive Mute Swan population is reduced.

10. Mute Swan management plans need to consider the semi-owned status of birds in more heavily urbanized waters. The EA needs to acknowledge that some individuals and communities may consider the benefits of Mute Swans to exceed the costs.

MDNR Mute Swan Management and Control Program Policy and Procedures (MDNR 2012a) and the EA (Section 3.1.4) include provisions for individual landowners, lake associations and similar groups to make decisions regarding management of swans on property under their management. The WS program adheres to these provisions.



Figure 1: Series of photographs documenting an example of Mute Swan aggression towards other wildlife (photo credit: Marlene Trapp, <http://www.mrtrapp.org/>).

11. EA should consider that Mute Swans are a grand symbol of the North Country.

Section 1.3.2 of the EA notes that Mute Swans have aesthetic, symbolic and existence value for many people and the EA considers aesthetic impacts of each of the alternatives in detail in Chapter 4. During the comment period we received letters in support of Mute Swans from individuals who enjoy and appreciate the birds. The perspective that Mute Swans are a symbol of the North Country is noted as another example of positive benefits of Mute Swans.

12. It is inappropriate to conduct Mute Swan removals unless there is scientific evidence of damage occurring at the management site.

Effective and responsible management of natural resources including wildlife is not limited to reducing past and ongoing damage to the resource; it also includes actions to prevent reasonably foreseeable threats to the resource. Analysis in the EA and review of available information by the MDNR indicates that there is sufficient cause to act to reduce current and likely future damage to natural resources in the state caused by Mute Swans (See Response 3 above). In a ruling for Southern Utah Wilderness Alliance, et al. vs. Hugh Thompson, Forest Supervisor for the Dixie National Forest, et al., the United States District Court of Utah denied plaintiffs' motion for a preliminary injunction. In part, the court found that a forest

supervisor needs only show that damage from wildlife is threatened, to establish a need for wildlife damage management (Civil No. 92-C-0052A January 20, 1993).

13. When swans do bring up SAV it enables other waterfowl to feed on plants they cannot otherwise reach.

As noted in the EA Section 1.4.1, Mute Swans have been estimated to consume less than 50% of what they remove during foraging. When Mute Swans are foraging in deep water, some material that would not have otherwise been obtainable may become available for other birds. However, Mute Swans do not confine their foraging to deep water where other smaller birds cannot feed, and beneficial impacts are likely minimal in comparison to consumption and damage of forage in shallow waters that would ordinarily be available to these species.

14. Why are you protecting Trumpeter Swans at the Expense of Mute Swans? Trumpeter swans will do the same damage as Mute Swans. Additionally, Trumpeters are bigger and will eat twice as much as the Mute Swans which will only increase the vegetation consumption problem.

Trumpeter Swans, unlike Mute Swans, are native to Michigan. At one point, Trumpeter Swans were extirpated from Michigan and much of the U.S. In the 1980s, the MDNR started a reintroduction program as part of a North American Restoration Plan for Trumpeter Swans. After much effort, the population is gradually increasing. The state of Michigan lists Trumpeter Swans as a threatened species. Trumpeter Swans are slightly larger than Mute Swans. Reviews in Birds of North America provided by Cornell University Lab or Ornithology indicate average reported mass of Trumpeter Swans ranged from 25.1-26.5 pounds for adult males and 21.2-22.7 pounds for adult females (Mitchell and Eichholz 2010). Reported average weight for Mute Swans ranged from 22.5-24.9 pounds for adult males and 17.4-20.9 pounds for adult females (Ciaranca et al. 1997). The species do have similar habitat and feeding requirements. Claims that food consumption for Trumpeter Swans are twice that of Mute Swans are unfounded. However, Trumpeter Swans are far less abundant than Mute Swans. The 2010 estimated Trumpeter Swan population in Michigan was approximately 756 birds, far less than the estimated 15,500 Mute Swans in the state (MDNR unpubl. data).

15. It is not accurate to describe a species as invasive if it has been here for more than 200 years in lands we have adapted and Europeanized.

Available data indicates that Mute Swans were first introduced to the state approximately 98 years ago (EA Section 1.3.1) and that the period of rapid population increase did not start until the 1980s to early 1990s (EA Fig. 1). The MDNR defines invasive species as, “non-native species that have the potential to become established and the potential to spread widely and cause ecological or economic harm or pose a risk to human health”. As required by the Migratory Bird Treaty Reform Act of 2004, the USFWS reviewed the available data and has determined that Mute Swans are not native to the United States. Data presented in Sections 1.3.1 and 1.4 of the EA provide information regarding the population growth and impacts of Mute Swans which further characterize this species as an invasive species. The amount of time a species is in an area does not preclude agencies from recognizing the ecological consequences of the species introduction and working to reduce adverse impacts.

16. Mute Swans are not aggressive to people unless people do something to provoke the behavior. Efforts should focus on managing people not swans.

Reports of Mute Swans displaying aggressive behavior towards humans are investigated by the MDNR and/or WS to verify a threat to human safety. There are instances when aggressive behavior by Mute

Swans appears to have been provoked. These situations are not deemed a threat to human safety and, consequently, the swans are not removed. In other instances, Mute Swans display aggression without provocation. As part of the investigation process, questions are asked about the human behaviors towards the swans. If humans are believed to be disturbing or physically harming the swans, the incidents are reported to MDNR Law Enforcement. The agencies agree that education plays an important role in preventing Mute Swan aggression toward people, and work to inform landowners/managers of ways to live with the territorial and defensive behavior of swans (EA Section 3.1.3).

17. It is inappropriate to use example on Black Terns because there is no science. It is the same as if commenter said they have seen no examples of Mute Swans causing damage in their area.

The example of the Black Tern nesting colony is a well-documented example specific to Michigan of how Mute Swans have adversely impacted a state-listed endangered species. The agencies do not contest that limited numbers of Mute Swans can exist in some areas without undue ecological harm. It is for this reason, and because Mute Swans have high aesthetic value for some Michigan residents; that the MDNR plan does not call for the removal of all Mute Swans from the state.

18. If swans eat all SAV why do they keep coming back to the same areas year after year?

Mute Swan impacts vary depending on site conditions. The primary concerns of the MDNR are whether foraging by an increasing Mute Swan population may be sustained over time without adverse consequences for the ecosystem; and that the Mute Swan population in the state is consuming resources which would otherwise be available to native birds. Foraging Mute Swans disturb the substrate while feeding which can create conditions favorable for colonization by invasive plants. Mute Swans can consume up to approximately 8 pounds of food a day or 2,920 pounds per year (Ciaranca et al. 1997). While some areas may be able to sustain foraging by limited numbers of swans, other areas, particularly areas of open water where birds congregate during the winter, may not (Cobb and Harlan 1980, Allin 1981, Chasko 1986). Because of their large size, Mute Swans may be able to exclude smaller native birds from these sites, so Mute Swans may remain even though the overall ability of a site to support waterfowl is declining.

19. Why are mute swan removals proposed for developed areas where Trumpeter Swans and Common Loons will never become established?

Typically on “developed” lakes, MSDM is requested by the local community because of the aggressive behavior of the birds towards other waterfowl and humans, or large amounts of fecal matter entering the water and shoreline recreational areas. Although less common, there have been Trumpeter Swans on developed lakes where MSDM has occurred. Management on developed lake also reduces overall Mute Swan population, decreasing the recruitment of new swans, which will eventually expand into other areas. In many areas, open water is not available for swans in the winter and swans move to areas of open water. Overwintering waterfowl concentrate at these sites and demand for resources is high. Foraging by high densities of Mute Swans reduces the resources available for native birds and can adversely impact the long-term sustainability of these essential waterfowl areas.

20. Why does the DNR allow goose roundups on lakes with Mute Swans if Mute Swans chase off all geese?

Not all Mute Swans are aggressive toward other birds. Conflicts with resident Canada Geese can be a year-round issue, but aggressive behavior by Mute Swans is greatest during the breeding season and

diminished during the rest of the year. For this reason, the WS program does not recommend Mute Swans as a reliable means of resident Canada Goose damage management.

21. Why are lakefront owners the only ones who get to decide what lives and dies on their lakes? Other residents in the community pay taxes and use natural resources and should have a voice too.

The MDNR is responsible for the management of Mute Swans in Michigan (MCL 324.40105). State policy and rulemaking procedures provide opportunities for Michigan residents to participate in the development of management policy in the state by appealing to their district Natural Resource Commissioner or participating in public comment periods during monthly Natural Resource Commission meetings. State regulations and policy support the right of landowners to act to reduce damage on their property. If the owners a lake property request management of the Mute Swans on their property, they have that right within the constraints established in the MDNR Mute Swan Management and Control Program Policy and Procedures.

22. Why are you doing swan egg removal when swans will just re-nest? 2 pairs on Wolverine Lake re-nested and have 6-7 babies per brood. Agencies should just leave 1-2 eggs.

Nest and egg destruction and egg oiling/addling/puncturing are viable methods for reducing reproduction. However, aggressive behavior is likely to decline if Mute swans do not have eggs or chicks to defend. If eggs are left in the nest but rendered unviable through oiling, addling or puncturing, birds will persist in defending the area until they give up on the nest. Consequently, if birds are unlikely to re-nest, nest and egg removal or destruction may be a preferred strategy for addressing aggressive behavior without removing the adult swans. The Decision Model (EA Section 3.1.2) used by WS involves a continuous feedback loop which incorporates information learned on management projects into future management decisions (e.g., adaptive management). The WS program will continue to work with cooperators to develop effective Mute Swan conflicts management strategies and will adapt strategies as needed in context of information learned during ongoing management activities (e.g., information on likelihood of Michigan Mute Swans to re-nest if eggs and nests are destroyed).

23. It is irrational to use disease and feces as a reason for management and removals. Native birds carry the same diseases and are not targeted for management.

Concerns regarding disease transmission are generally not the primary factor motivating a request for MSDM except in situations where there are high concentrations of fecal matter in recreational areas. In these situations, it is the volume of fecal matter and the likelihood of human contact with the fecal matter which triggers concerns.

24. It is inappropriate to claim you are removing birds for disease control (Canada Geese) and then donating them for human consumption. What about the disease of concern?

Many species of animal which are consumed by humans, including domestic animals, contain pathogens in their digestive tracts which may be harmful to humans or may transmit diseases through other secretions of live animals. However, these illnesses are not generally carried in muscle tissue. Disease risks are addressed through proper handling of carcasses and food preparation procedures.

25. Mute Swans should be used/donated for human consumption.

Mute Swans are generally not consumed by humans in the United States. Concerns about pesticide and heavy metal contamination have been identified due to the feeding behaviors of Mute Swans. Because they feed on submerged vegetation and ingest bottom sediment, they may be at a higher risk for environmental contamination. However, WS is working with the MDNR Wildlife Disease Laboratory on a research project looking at the pesticide and toxic elements contamination levels in Mute Swan meat. Until the evidence shows that Mute Swan meat is safe for human consumption, no meat will be donated.

26. EA is inaccurate when it says Mute Swans eat same food as native Trumpeter Swans, ducks and geese.

Commenter provided no information to support assertion. Overlap in diet documented in citations in EA including Bailey et al. (2008) which document dietary overlap and potential for adverse impacts (EA Section 1.4.1).

27. How can the state justify killing mute swans to protect ducks and geese when the state issues permits to people to kill more ducks and geese than the swans will take? In one year nearly 8 million ducks and geese were killed in the Midwest flyway alone.

While Mute Swans may cause some mortality to other native waterfowl species, the larger concerns are the displacement of native species from breeding habitats and destruction of wetland habitat. Native species forced into potentially inferior nesting areas or delayed breeding because of harassment may experience reduced productivity. The decrease in the quality of wetland habitat because of the presence of Mute Swans and the associated reduction in the amount of native wetland vegetation would exacerbate productivity problems. Because they are migratory species, native waterfowl are managed cooperatively between federal, state, and provincial agencies. North American waterfowl are the most monitored group of wildlife and hunting regulations are largely based on this large body of data. Regulations (e.g., season length and species bag limits) are set annually based on biological information. The agencies know that the harvest of these species is sustainable because of this intensive annual monitoring. An additional indirect benefit of waterfowl hunting is the millions of dollars that go directly towards conservation of wetlands from the sales of waterfowl hunting licenses and stamps.

28. Most Mute Swans are peaceful and passive. Entire population should not be controlled because only a few birds are aggressive

Cases of aggressive behavior by Mute Swans are dealt with on a case by case basis (See Response 16 above). State Mute Swan population management objectives are primarily based on concerns pertaining to the impacts of a high Mute Swan population on native species and ecosystems.

29. The MDNR Mute Swan management objectives are arbitrary and unjustified.

The current MDNR Mute Swan Management and Control Policy and Procedures are the product of considerable work on the part of the MDNR, including the formation of a Mute Swan Forum to gather input from stakeholders. The MDNR management objectives represent a compromise between the desire to remove a non-native invasive species which can negatively impact native species and ecosystems and the understanding of the aesthetic value of Mute Swans for some Michigan residents. These objectives are consistent with Executive Order which directs federal agencies to to use their programs and authorities to prevent the spread or to control populations of invasive species that cause economic or environmental harm, or harm to human health. To comply with Executive Order 13112, WS may

cooperate with other federal, state, or local government agencies, or with industry or private individuals to reduce damage to the environment or threats to human health and safety. The MDNR and Tribes have management authority for managing Mute Swans in Michigan. Revisions to the state management objectives are outside the scope of the analysis and WS authority.

30. Was EA made available to the public through proper channels?

Yes, the EA was made available for public comment in accordance with the Council on Environmental Quality regulations, APHIS implementing procedures for the NEPA and the provisions of a WS Federal Register notice pertaining to WS publication of NEPA legal notices (FR 72(54):13237-13238). The EA was prepared and released to the public for a 30-day comment period via a legal notice placed on June 7-9, 2010 in the *Lansing State Journal*, and a notice of availability for comment published on the WS web site http://www.aphis.usda.gov/wildlife_damage/nepa.shtml. A letter regarding the availability of the EA for public comment was also mailed directly to agencies, tribes, organizations, and individuals with probable interest in the proposed program.

31. If management authority for Mute Swans resides with the state, what is the federal role in this issue?

USFWS authority for bird management is limited to species protected under the Migratory Bird Treaty Act (MBTA), species protected under the Endangered Species Act and management of wildlife on lands administered by the USFWS (e.g., national wildlife refuges). After reviewing available information, the USFWS has determined that Mute Swans are not native to the U.S. and are not subject to protection under the MBTA. Consequently, primary management authority for Mute Swans resides with the state and tribes. In Michigan, the USFWS works with the MDNR regarding management of Mute Swans on refuge lands. The WS program is authorized to provide assistance to agencies individuals and organizations with wildlife damage management. Wildlife Services does not have regulatory authority, and program activities are conducted in accordance with applicable state, tribal and federal regulations.

32. Non-native status of Mute Swans should be reconsidered. Paleontological and other evidence should be considered when determining residence status of Mute Swans.

In accordance with the Migratory Bird Treaty Reform Act of 2004, the USFWS reviewed available data on Mute Swans and determined that they are not a native species protected by the Act. Paleontological evidence was part of the material presented by Alison and Burton (2008) in support of their assertion that Mute Swans are a native species and should be protected by the Act. However, multiple subsequent reviews of Alison and Burton (2008) have refuted the conclusions in their publication (Warnock 2009, Askins 2009, Elphick 2009, Seymour and Peck 2009). The WS program defers to the authority and expertise of the USFWS regarding the status of Mute Swans.

33. EA needs to consider the impact of lethal methods on society and the trauma to individuals who see birds killed.

The issue of humaneness and aesthetic values are addressed in detail for each of the alternatives in Chapter 4 of the EA. The WS program is aware that some individuals will find the thought or sight of Mute Swans distressing. Consequently, WS strives to conduct removal activities at times and in locations which minimize the likelihood that members of the public may encounter removal activities. See also EA Sections 3.3.1 and 3.3.2.

34. An Environmental Impact Statement (EIS) is needed to further consider the impact of Mute Swans on submerged aquatic vegetation because available information is insufficient to warrant action.

WS has conducted an independent review of the available information regarding Mute Swan impacts to natural resources and has determined that there is sufficient evidence of need for action to warrant WS involvement in MSDM in Michigan. Analysis in the EA indicates that there will not be a significant impact, individually or cumulatively, on the quality of the human environment because of this proposed action, and that these actions do not constitute a major Federal action (See attached Decision and FONSI). Therefore, an EIS will not be prepared at this time.

35. The EA provides insufficient evidence that swans are contributing to coliform bacteria problems. Coliform bacteria problems occur in areas without swans too.

As part of the purpose of this EA is to identify and evaluate all potential reasons why MSDM may be requested (Need for Action), we included all known potential disease risks. We agree that there are many potential sources of coliform bacteria contamination and that the risk of disease transmission between Mute Swans and people is low. WS recognizes and defers to the authority and expertise of local and state health officials in determining what does or does not constitute a threat to public health. Tests are available which can help to identify the source of coliform bacteria including determining whether or not the bacteria are of avian origin. Test data and evaluations of bird activity in the affected area may be used in combination to determine the likely role, if any, of Mute Swans in a coliform bacteria problem. WS would only conduct Mute Swan removals solely to address coliform bacteria issues at the recommendation of the state or local health department.

Concerns regarding disease transmission are generally not the primary factor motivating a request for MSDM except in situations where there are high concentrations of fecal matter in recreational areas. In these situations, it is the volume of fecal matter and the likelihood of human contact with the fecal matter which triggers concerns.

36. EA fails to consider that Mute Swans are part of the poultry industry in Poland, Germany and France and a gourmet meal in England. EA should consider commercial cropping of Swans as an industry and a potential fine dining opportunity instead of removing them and dumping them in landfills.

The MDNR management objective is to reduce the total number of Mute Swans in the state and associated impacts on natural resources. Commenter proposes allowing Mute Swans to remain in the wild and “harvesting” each year’s production of young for captive rearing (finishing) and commercial sale. The proposal appears to be intended to function in a fashion similar to the use of egg treatments analyzed in Alternative 3 in that it would decrease productivity of the swan population. The logistical challenges of executing this proposal on a scale sufficient to meet MDNR management objectives for swans would be similar to or greater than those analyzed in the EA for Alternative 3. The proposal would also allow the current number of adult swans to remain in the state and impact resources for a longer period than the preferred alternative.

Some may consider this proposal a means of putting the swans to a “useful purpose”, but people concerned about the welfare of individual swans and swan family groups will find this alternative less acceptable than Alternative 3 because it results in the death of the swans. Further, because the current number of adult swans would not be reduced until birds leave the state or die of natural causes, and

because the swans would be allowed to continue to produce young, this alternative may result in killing of more swans than the preferred alternative.

In conclusion, this proposal would not be as effective in reducing Mute Swan impacts on natural resources as Alternative 1 and would likely result in the death of more swans before the state management objectives are reached than Alternative 1. For these reasons, this alternative does not warrant additional analysis at this time.

37. Aircraft incidents and agriculture damage are not a priority to the MDNR and are not mentioned in its Mute Swan Management and Control Program Policy and Procedures. Therefore they should not be addressed or included in the EA. Including these issues in EA makes swan issue look worse than it really is.

The purpose of the EA is to review the types of damage which may be caused by Mute Swans and situations where WS may be requested to provide assistance. The EA notes that unlike the MDNR concerns regarding Mute Swans impacts on natural resources, damage to agriculture and bird strike hazards are not common in Michigan. Bird strike hazards and agricultural damage are generally addressed on a case-by-case basis and would not warrant large-scale management of the state Mute Swan population. Accordingly, they are not addressed specifically in the state Mute Swan Management and Control Program Policy and Procedures. However, the state policy and procedures allow for the taking of Mute Swans which are endangering or about to endanger public health, safety or welfare (e.g., bird hazards to aircraft) and Section 5.51 of the Wildlife Conservation Order (Damage and nuisance control permit issuance) allows for the issuance of permits for the take of wildlife which is causing damage to property.

38. Diseases mentioned in the EA are not related whatsoever to the Mute Swan and none of the diseases is a real human health problem. If Mute Swans are not native to North America then they cannot play an important role in life cycle of disease in North America.

Section 1.4.2 discusses the disease issues and human health concerns and acknowledges that the risk of infection is low. The purpose of this EA is to identify and evaluate all potential reasons why MSDM may be required (Need for Action), we included all known potential disease risks. All of the diseases discussed in detail in this EA have been documented in Mute Swans. Species not native to an area can play an important role in the life cycle of diseases if they are biologically compatible with that disease. Examples of this in North America include native diseases found in and transmitted by European Starlings (*Sturnus vulgaris*) (Gaukler et al. 2009) or feral swine (*Sus scrofa*) (Witmer et al. 2003). Non-native species can actually amplify disease transmission because a new competent host has been introduced into a system that previously has been in equilibrium. This principle is demonstrated as diseases not endemic to an area are introduced, find sufficient hosts, and are amplified (McLean 2007). Examples of this in North America include the introduction of West Nile Virus (Atrsob et al. 2009) and White Nose Syndrome (Frick et al. 2010)

39. None of the diseases discussed in the EA is a real health problem. Only a portion of the members of the *Schistosoma* genus are transmissible to humans. The same is true for *Chlamydia* and *Giardia* spp. There is no proof that Mute Swans carry forms of these diseases that are transmissible to humans.

Section 1.4.2 discusses the disease issues and human health concerns and acknowledges that the risk of infection is low. As part of the purpose of this EA is to identify and evaluate all potential reasons why MSDM may be required (Need for action), we included all known potential disease risks. Wildlife

Services' primary involvement in the management of these types of diseases would be to aid other Federal, State, and local government and research entities in monitoring for the presence or absence of disease. Wildlife Services recognizes and defers to the authority and expertise of local and state health officials in determining what does or does not constitute a threat to public health. All of the diseases discussed in detail in this EA have been documented in Mute Swans. The EA does acknowledge that the role Mute Swans are playing in the maintenance or transmission of some of the diseases is unclear at this time and continued research is underway.

40. Would WS work with private citizens in implementation of nonlethal solutions for MSDM? This could be a critical component of an effective management plan and garnering citizen support for management goals.

The MDNR has authority for Mute Swan management in Michigan. If state regulations allow for private citizens and organizations to offer this type of assistance with nonlethal management, WS could provide information on these services to cooperators in situations where the services would be practical and effective. Under the preferred alternative, WS could also cooperate with pilot programs and research testing nonlethal management strategies if requested. See also Response 5.

41. Damage should be managed as humanely as possible on a case by case basis.

WS uses the WS decision model to develop site specific management strategies which consider a range of factors including humaneness (EA Sections 3.1.2, 2.2.4 and Chapter 4 analysis of alternatives).

42. State Mute Swan Management and Control Program Policy and Procedures needs to state where Mute Swans would be allowed to remain and how the state intends to maintain a Mute Swan population.

Alterations to the MDNR Mute Swan Management and Control Program Policy and Procedures are outside the scope of this analysis. However, WS review of the policy and procedures indicates that the MDNR intends to remove all Mute Swans from MDNR-administered lands. Given the provisions for requiring landowner/community assent for MSDM established in the policy and procedures, it is anticipated that once MDNR management objectives are achieved, the majority of Mute Swans will be located on private or community property in areas where affected landowners have chosen to allow Mute Swans to remain. The MDNR Mute Swan Management and Control Program Policy and Procedures include provisions for population monitoring and recording take of Mute Swans which should enable the state to effectively monitor and manage the swan population.

43. How reliable can the state Mute Swan survey be when the 95% confidence interval ranges from 3,000 to more than 27,000 birds? Audubon Christmas Bird Count (CBC) data have counted only 3,000-4,000 Mute swans per year for the last 5 years or so. If the state estimates are correct, how could they miss 11,000-12,000 birds, especially given that Mute Swans are highly visible and congregate in urban/suburban areas in winter?

The issue of the reliability of the MDNR aerial surveys for use in Mute Swan management are addressed in EA Section 2.4.2. Surveys are conducted following the SOP established by the USFWS (USFWS 1987). The survey methodology used is scientifically sound and proven and used by other states and Canadian provinces for waterfowl management including providing guidance for licensed waterfowl harvest seasons.

As noted by the commenter, the CBC is not intended for use in estimating bird populations. We do not concur with commenter assertions that Michigan Mute Swans congregate in urban/suburban areas in winter. Mute Swans congregate in areas with open water and available forage. Some of these areas may be in urban/suburban locations, some are not. A review of the CBC surveys from the 2006-2007 survey through the 2010-2011 survey indicate that there has been an average of 63 CBC count circles per year in Michigan (National Audubon Society 2012). Each count circle is approximately 177 square miles in area, so, on average, approximately 11,151 square miles of area is included in Michigan CBC surveys. Statistics for the state of Michigan indicate that there are 59,415 square miles of land and inland water and an additional 38,575 square miles of great lakes water in Michigan (State of Michigan 2011). Assuming that CBC surveys could include all inland waters and a portion of the Great lakes water area, the CBC survey in Michigan only covers approximately 11-19% of the area in the state. Consequently, it is entirely probable that a large number of swans are not in the areas counted by the CBC survey. Furthermore, while Mute Swans are not long-distance migrants, seasonal movements to areas with open water and forage are common. These movements may take birds which breed in Michigan into neighboring states where they would not be represented in Michigan CBC data.

APPENDIX B

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