

NAME OF SPECIES: <i>Cygnus olor</i>	
Synonyms: <i>Anas olor</i> (16)	
Common Name: Mute swan	
A. CURRENT STATUS AND DISTRIBUTION	
I. In Wisconsin?	1. YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
	2. <u>Abundance</u> : One estimate in Wisconsin is around 600 and growing (7). The 2006 WI DNR statewide survey counted 693 mute swans (8).
	3. <u>Geographic Range</u> : The WI DNR stated that the northeastern part of the state had 600 of the statewide 693 mute swans, and Oconto County had 454 of the 600 mute swans (8). This study was done in the fall of 2006. Southeast WI has the next highest population. In the previous 20 years, southeastern WI had the largest percentage of breeding mute swans, between 75-90% (8).
	4. <u>Habitat Invaded</u> : Mute swans inhabit areas with shallow coastal ponds, ponds, bogs and streams following into lakes (1). They are also found in open bays, open marshes, lakes, and ponds with extensive submerged aquatic vegetation (SAV) (2). Disturbed Areas <input type="checkbox"/> Undisturbed Areas <input type="checkbox"/>
	5. <u>Historical Status and Rate of Spread in Wisconsin</u> : Transient feral mute swans first showed up in WI in 1958 (17). Captive birds were released by private individuals and at least one municipality during the 1960s and 1970s. Reproducing populations established in southeast and northwest WI by the early 1970s (17). Because of their aggressive nature, mute swans have also been used to keep geese off golf course ponds (11).
	6. <u>Proportion of potential range occupied</u> : Most suitable habitat in WI remains unoccupied by mute swans. Potential exists for a large population increase.
	7. <u>Survival and Reproduction</u> : They reproduce and survive in WI.
II. Invasive in Similar Climate Zones	1. YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> <u>Where (include trends)</u> : This species is found extensively in the Chesapeake Bay area (3). Resident birds are also found around the Great Lakes, the Atlantic Coast, and in the Atlantic Flyway (1, 3).
III. Invasive in Similar Habitat Types	1. Upland <input type="checkbox"/> Wetland <input checked="" type="checkbox"/> Dune <input type="checkbox"/> Prairie <input type="checkbox"/> Aquatic <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Grassland <input type="checkbox"/> Bog <input checked="" type="checkbox"/> Fen <input checked="" type="checkbox"/> Swamp <input checked="" type="checkbox"/> Marsh <input checked="" type="checkbox"/> Lake <input checked="" type="checkbox"/> Stream <input checked="" type="checkbox"/> Other:
IV. Habitat Affected	1. <u>Where does this invasive reside</u> : Edge species <input type="checkbox"/> Interior species <input type="checkbox"/> Wetlands with extensive SAV for food and nest construction are preferred habitats.
	2. <u>Conservation significance of threatened habitats</u> : This species is found in wetland ecosystems. Mute swans have
V. Native Habitat	1. <u>List countries and native habitat types</u> : This species is found in the north and central parts of Europe and Asia (1, 2). Mute swans have coexisted with humans for centuries. Long history of semi-captivity in Europe (17).
VI. Legal Classification	1. <u>Listed by government entities?</u> Not protected under the Migratory Bird Treaty Act. Some states grant the bird protection (1).

	<p>Listed as a protected species in WI. Natural Resources Board approved control policy allows for DNR staff to shoot free-ranging mute swans. Mute swan possession allowed with game farm license and adherence to restrictions of enclosure in covered pen or pinioned and rendered sterile by licensed veterinarian.</p> <p>2. <u>Illegal to sell?</u> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/></p> <p>Notes: This species can be possessed and sold but not released.</p>
B. ESTABLISHMENT POTENTIAL AND LIFE HISTORY TRAITS	
I. Life History	<p>1. <u>Type of Animal:</u> Mammal <input type="checkbox"/> Bird <input checked="" type="checkbox"/> Reptile <input type="checkbox"/> Amphibian <input type="checkbox"/> Fish <input type="checkbox"/></p> <p>2. <u>Age of Maturity or time to self sufficiency:</u> This species becomes mature around the age of 3 years (2). They become self - sufficient in about a year: the young are chased away/run off by their parents (2).</p> <p>3. <u>Gestation Period:</u> Incubation lasts around 36-38 days (2, 16).</p> <p>4. <u>Mating System:</u> Polygamous <input type="checkbox"/> Polyandrous <input type="checkbox"/> Monogamous <input checked="" type="checkbox"/></p> <p><u>Notes:</u> One source states this species will mate for life (1). Another source say that this is not necessarily the case, as they have been known to “divorce” and find a new mate. This source stated that they are monogamous for at least a breeding season (2, 16). Mute swans do not mate for life but establish pair bonds (16).</p> <p>5. <u>Breeding/ Breeding period:</u> This species breeds from March to April and averages 2-10 eggs/clutch, but can range up 12 eggs (2, 16). Mute swans typically have 1 cultch/year (2).</p> <p>6. <u>Hybridization potential:</u> One source stated that hybridization is not a problem (7).</p>
II. Climate	<p>1. <u>Climate restrictions:</u> They are sensitive to cold weather (7). Frozen water conditions will cause them to move to ice-free wetlands that support appropriate submerged aquatic vegetation.</p> <p>2. <u>Effects of potential climate change:</u> Climate change may benefit mute swans because they are sensitive to cooler weather (7). On the other hand, climate warming may lead to the loss of productivity of SAV (6), which may negatively affect mute swans.</p>
III. Dispersal Potential	<p>1. <u>Pathways - Please check all that apply:</u></p> <p><u>Unintentional:</u> Bird <input type="checkbox"/> Animal <input type="checkbox"/> Vehicles/Human <input type="checkbox"/> Wind <input type="checkbox"/> Water <input type="checkbox"/> Other:</p> <p><u>Intentional:</u> Ornamental <input checked="" type="checkbox"/> Forage/Erosion control <input type="checkbox"/> Medicine/Food: Recreational <input type="checkbox"/> Other: This species has been brought into golf courses to keep away geese (11).</p> <p>2. <u>Distinguishing characteristics that aid in its survival and/or inhibit its control:</u> This large bird can be very aggressive and intimidating toward other animals and humans.</p>
IV. Ability to go Undetected	<p>1. HIGH <input type="checkbox"/> MEDIUM <input type="checkbox"/> LOW <input checked="" type="checkbox"/> This is a conspicuous bird in many respects: cobs (males) actively patrol their territory during incubation and brooding, they build large nests, and evidence of feeding is readily observed.</p>

C. DAMAGE POTENTIAL

I. Competitive Ability

1. Presence of Natural Enemies: This species is very aggressive and has been known to be very protective of their young. Mesopredators like raccoons may take eggs (2). Large predators like coyotes may kill a mute swan, but this is not very common (2).

2. Competition with native species: This species is aggressive towards other swans, waterfowl, and other water birds and competes with swans, waterfowl and water birds for food and nesting habitat (1, 2, 5, 7, 8, 14, 16). The common loon and trumpeter swan are two species of most concern that are affected by the mute swan (2). This species may have significant impacts on waterfowl that breed in Great Lakes marshes (5). They are extremely territorial (5). Mute swans regularly attack many species of waterfowl and water dependant birds (7). They have killed many species of waterfowl and displaced other waterfowl and water birds from nests (7). Competition usually occurs in the winter and spring when food is limited (7). This species is found in the Great Lakes, which is an important staging area for many waterfowl and water birds (7). Mute swans reduce the amount of staging and breeding areas for native waterfowl, potentially lowering the carrying capacity for these waterfowl species (7). They out-compete trumpeter swans for nesting sites because of the mute swan's aggressiveness (10). Mute swans displace trumpeter swans (11). One studied stated that trumpeter swans can out-compete mute swans, possibly scaring mute swans away from the area (12). Mute swans are very aggressive towards tundra (whistling) swans (14). Mute swans could be one potential cause to the decline of tundra swans, but more studies are needed to confirm this (14). This species is a threat to biodiversity because it will trample eggs and chicks of nesting water birds, like the black skimmer and terns (14).

2. Rate of Spread:

-changes in relative dominance over time:

-change in acreage over time:

HIGH(1-3 yrs) X MEDIUM (4-6 yrs) LOW (7-10 yrs)

Notes: In the Chesapeake Bay area the mute swan population increased from 6,000 to 12,500 in less than 15 years (3). The annual growth rate of mute swans on Lake Ontario is 10%, down from 16% in the 1990's (5). In 1962 five mute swans escaped from their owner in Maryland. By 1999 Maryland had a population of 4500 mute swans (9). Michigan has 2-3000 mute swans (17).

II. Environmental Effects

1. Alteration of ecosystem/community composition?

YES X NO

Notes: Mute Swans can consume 6-8 pounds of SAV/day (7). While eating, mute swans will uproot plants instead of just grazing on the leaves, thus destroying the vegetation (7). Mute swans can eliminate certain plant species from an area (7). Mute swans can have long term impacts on plant communities, wild celery for example(7). Mute swans can severely impact SAV beds (8). In the Chesapeake Bay area the mute swan population can consume up to 9,000,000 pounds of SAV/year (14). Mute swans are known for their ability to carry Avian Infuenza (4). They can become infected

	with and carry the highly pathogenic avian influenza (HPAI) strain H5N1, which causes high mortality rates in birds (4).
	2. <u>Alteration of ecosystem/community structure?</u> YES X NO <input type="checkbox"/> Notes: Mute Swans can consume 6-8 pounds of SAV/day (7). While feeding, mute swans will uproot plants instead of just grazing on the leaves, destroying the vegetation (7). Mute swans can eliminate certain plant species from an area (7). Mute swans can have long-term impacts on plant communities, one species mentioned was wild celery (7). Mute swans can severely impact SAV beds (8). In the Chesapeake Bay area the mute swan populations can consume up to 9,000,000 pounds of SAV/year (14).
	3. <u>Alteration of ecosystem/community functions and processes?</u> YES X NO <input type="checkbox"/> Notes: By reducing SAV, it may affect waterfowl and the crabbing and fishing industry (9).
	4. <u>Exhibit Parasitism?</u> YES <input type="checkbox"/> NO X Notes:

D. SOCIO-ECONOMIC EFFECTS

I. Positive Aspects of the Species to the Economy/Society:	Notes: The mute swans has aesthetic value to some people.
II. Potential Socio-Economic Effects of Requiring Controls: Positive: Negative:	Notes: When this species has been controlled in the past, there has been public outcry (7). This species can affect the crabbing and fishing industry and traditional waterfowl hunting areas when it depletes an area of SAV. (9). Requiring controls of mute swans may allow for SAV and organisms it supports to re-establish.
III. Direct and Indirect Socio-Economic Effects of the Animal :	Notes: This animal can deplete an area of SAV, and the decrease in SAV could hurt crabbing and fishing industries (9), waterfowl hunting, as well as other businesses that use SAV.
IV. Increased Costs to Sectors Caused by the Animal:	Notes: Fishing, crabbing (9) and possibly hunting industries because mute swans can lower the carry capacity for these animals by disrupting SAV beds which provide food and shelter (7). This species may effect the poultry industry because it is a carrier of avian influenza, and the mute swan is mobile after contracting the disease (4).
V. Effects on Human Health:	Notes: This species has been known to attack people if they get too close to the breeding territory (2, 7). Mute swans could seriously injure children (2). Avian influenza concerns.
VI. Potential Socio-Economic Effects of Restricting Use:	Positive: Possible increase of SAV in areas previously devastated by mute swans, and associated benefits with increased SAV. SAV in some locations is already suffering from climate warming (6), and the mute swan is just an added stressor. Negative: Public outcry and concern over control measures.

E. CONTROL AND PREVENTION

I. Costs of Prevention (please be as specific as possible):	Notes: The exact cost not mentioned in the literature. Allowing the public and private sectors to assist with control efforts would minimize costs (7).
II. Responsiveness to Prevention	Notes: Most effective long-term solution is to reduce adult survival

Efforts:	rates. Removing breeding individuals is 3-4 times more effective than removing eggs (16). Clutch reduction effectiveness of population control is questionable (16). In Wisconsin control methods showed a 35% reduction in the numbers of adults and non-breeding mute swans (8). Currently WI has a trap, neuter, and release program in counties with public objection to lethal control methods of mute swans (15).
III. Effective Control Tactics:	Mechanical X Biological X Chemical <input type="checkbox"/> Times and uses: Reduce reproduction and/or adult survival rates. Population modeling indicates the most effective way to reduce mute swan populations in the long-term is to reduce adult survival rates. Capture and remove adults during wing feather molt, hunting seasons, or professional culling. Addling, oiling, or replacing viable eggs in nest with dummy eggs can prevent population expansion.
IV. Minimum Effort:	Notes: Allowing the public and private sectors to help remove mute swans could help control the swan populations (7). This would require minimal effort from state officials.
V. Costs of Control:	Notes: Primary cost is for labor to capture adults or remove/replace eggs.
VI. Cost of Prevention or Control vs. Cost of Allowing Invasion to Occur:	Notes: This species is extremely devastating to many ecosystems and needs to be removed. This species has no positive aspect to it. The cost of destroying significant threatened habitats is not worth allowing this invasion to occur.
VII. Non-Target Effects of Control:	Notes: Mute swans may be misidentified as native trumpeter or tundra swans. Education efforts should eliminate this problem.
VIII. Efficacy of Monitoring:	Notes: The CBC could work to monitor populations of mute swans. The CBC has had problems in the past counting mute swans in WI (8). Mute swans are too uncommon and irregularly distributed to be monitored well by the BBS. The DNR spring and mid-winter waterfowl surveys may be used to locate mute swans locations.
IX. Legal and Landowner Issues:	Notes: Lethal mute swan control can cause public outcry. In some areas of WI that experienced a large public opposition to lethal control, a trap, neuter, and release program is in place (15).

F. REFERENCES:

Number	Reference
1	http://www.birds.cornell.edu/AllAboutBirds/BirdGuide/Mute_Swan_dtl.html
2	Ivory, A. 2002. "Cygnus olor" (On-line), Animal Diversity Web. Accessed August 14, 2007 at http://animaldiversity.ummz.umich.edu/site/accounts/information/Cygnus_olor.html .
3	http://www.pwrc.usgs.gov/resshow/perry/muteswan.htm#Background
4	http://www.ehnsi.gov.uk/biodiversity/sap_uk/avian/avian_faq.htm
5	http://adaptation.nrcan.gc.ca/projdb/pdf/coastal1_e.pdf
6	http://www.cira.psu.edu/mara/results/foundations_report/Box%207.1.pdf
7	http://www.bsc-eoc.org/download/Mute%20Swan.pdf
8	http://dnr.wi.gov/org/nrboard/agenda/2007/070124-3B8.pdf
9	http://www.dnr.state.md.us/wildlife/muteswans.html
10	http://dnr.wi.gov/org/caer/ce/news/on/2006/on060404.htm#art1

11	http://www.brookfieldzoo.org/pgpages/pagegen.62.aspx
12	http://www.trumpeterswansociety.org/news/publications/16th_conf/26Johnson-2.pdf
13	http://www.dnr.state.md.us/wildlife/mstfpc.html#msrecommend
14	http://www.chesapeakebay.net/info/muteswan.cfm
15	http://www.eaglespringlake.us/Page%20Documents/Important%20Info/4-3-07%20DNR%20Letter%20-%20Mute%20Swan%20Capture.pdf
16	http://www.invasivespecies.net/database/species/ecology.asp?si=973&fr=1&sts

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