

# REVIEW OF CAPTIVE-REARED MALLARD REGULATIONS ON SHOOTING PRESERVES

FINAL DRAFT

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## **EXECUTIVE SUMMARY**

As numbers of wild ducks declined and hunting opportunities became more restricted in the mid-1980s, interest in shooting captive-reared mallards on shooting preserves increased dramatically. In 1985, the U. S. Fish and Wildlife Service (Service) received a series of letters regarding the interpretation of regulations in 50 CFR 21.13 and the practice in Maryland of releasing captive-reared mallards in a free-flighted condition on their State-licensed shooting preserves. Prior to this time, shooting preserves released birds from towers as a general practice and maintained tighter control to prevent these birds from escaping to the wild. The Service responded to the State of Maryland by strictly reiterating the intent of these regulations, mainly "...that such birds may be killed by shooting, in any number, at any time, within the confines of any premises operated as a shooting preserve under State license, permit, or authorization". Since then, the practice of releasing captive-reared mallards on State-licensed shooting preserves has been more broadly interpreted to allow releases of free-flighted birds. As a result of this de facto policy, the numbers of shooting preserves has grown significantly in some areas. However, this practice has become more controversial as large numbers of these birds are being released into areas where they are free to intermingle with wild populations of migratory waterfowl.

At the urging of the four Flyway Councils and the International Association of Fish and Wildlife Agencies, the Service was asked to conduct a review of the potential conflicts of releasing free-flighted captive-reared mallards on State-licensed shooting preserves and to assess the resulting effects upon migratory waterfowl. With assistance from States and Flyway Councils, all aspects pertaining to disease transmission, genetic introgression, and impacts upon wildlife-agency waterfowl management programs (e.g., population monitoring, banding, harvest surveys, and enforcement of various regulatory statutes), were examined during 2001-02, including authority and jurisdiction under the Migratory Bird Treaty Act.

Based upon this review, the Service's Division of Migratory Bird Management concludes that there is evidence of the potential for increased risks of disease transmission, genetic introgression and hybridization, confounding of established waterfowl-management databases,

and greater potential for violations of regulatory statutes stemming from these activities. The threat of disease transmission remains the primary concern among nearly all State wildlife agencies, and there is circumstantial evidence of possible association between the releases of captive-reared mallards and duck-plague outbreaks. These outbreaks appear to occur most frequently in areas where the largest numbers of captive-reared mallards are being released. Also, there is evidence of duck-plague vaccine virus spreading from captive-reared mallards to migratory waterfowl in Maryland. The effects upon genetic diversity and hybridization by captive-reared mallards on wild waterfowl is less dramatic and more difficult to quantify at the population level. Pairing and interbreeding of captive-reared mallards with wild mallards, black ducks, and mottled ducks have been documented, but little is known about these effects range-wide. Large-scale releases of captive-reared mallards in localized areas were found to have some limited effect on waterfowl management programs (e.g., population monitoring, banding, and harvest surveys), designed to track the status and harvest of migratory waterfowl, mainly in the Atlantic Flyway. These effects, however slight, can induce additional bias into important databases used by wildlife-management agencies to manage our waterfowl resources. The less effective these databases become, the more difficulty and uncertainty these agencies have in making informed decisions regarding population status and trends, habitat utilization, and appropriate waterfowl hunting seasons. In addition, there are international concerns, since banding data suggests that some of these birds are being recovered in Canada.

There is also the potential for increased risk of violations of Federal waterfowl hunting regulations involving live decoys, baiting, over-bagging, and take of wild ducks out of season. The inability to distinguish between captive-reared and wild mallards while in flight and the potential for problems caused by these birds intermixing, both on and off shooting preserves, are at the heart of law-enforcement issues regarding releases of free-flighted captive-reared mallards on shooting preserves. If a hunter happens to take a wild duck on a shooting preserve, all hunting prohibitions will apply to that “take”.

While the intent of the regulation 50 CFR 21.13 was to allow privately operated shooting preserves unlimited opportunity to shoot captive-reared mallards, provided there is a clear distinction from wild mallards, the Service is obligated to safeguard migratory waterfowl protected under the MBTA. Thus, our review suggests that there is sufficient ambiguity in the regulation 50 CFR 21.13, particularly as it relates to release methodology and containment of captive-reared mallards, to consider some revision or corrective action to limit intermixing with wild migratory waterfowl. Further, it is not clear whether property rights are retained or relinquished once captive-reared mallards are released in a free-flighted condition and are no longer within the possession and control of the respective shooting preserve. Private practices on shooting preserves should not affect or in any way threaten a public resource.

Therefore, we believe that the Service should consider working in conjunction with the four Flyway Councils and the International Association of Fish and Wildlife Agencies to revise the regulation in 50 CFR 21.13 to address the practice of releasing captive-reared mallards in a free-flighted or free-ranging condition for purposes of shooting on State-licensed shooting preserves and to address the issue of movements of captive-reared mallards. A large majority of States indicated that they favored more restrictive Federal regulations controlling the release of captive-reared mallards to prevent these birds from entering the wild population. The four Flyway Councils and the Canadian Wildlife Service have expressed support for the Service to implement new policy and regulations that address the release of captive-reared waterfowl into wild populations.

## **INTRODUCTION**

### **Purpose**

On June 1, 1993, the U.S. Fish and Wildlife Service (hereafter Service) published in the *Federal Register* (58 FR 31247-31249) a Notice of Intent (NOI) to review all aspects of regulations pertaining to the release and harvest of captive-reared mallards (*Anas platyrhynchos*) (Attachment 1). These regulations are specified in Title 50 of the Code of Federal Regulations, Part 21, Section 13 (50 CFR § 21.13), and pertain to harvest of captive-reared mallards on State-licensed shooting preserves (a.k.a. Regulated Shooting Areas or RSA's). This NOI provided the public with background information and informed the public of potential conflicts that may arise from these activities and invited their participation. The review was postponed pending the completion of several studies. Upon completion of these studies, the Service published a subsequent NOI on August 28, 2001 (66 FR 45274-45275), announcing its intention to resume the review. This report is in fulfillment of those NOIs and represents the Service's efforts to gather and assess information pertaining to the potential conflicts associated with this issue. The alternatives and recommendations presented in this document do not constitute new rule-making by the Service.

### **Scope**

This report is an assessment of potential conflicts regarding the management, health, and status of migratory waterfowl that may result from current regulations governing the release and harvest of captive-reared mallards on State-licensed shooting preserves (hereafter shooting preserves). This review does not address issues involving release and harvest of captive-reared mallards on areas outside of shooting preserves, where migratory bird hunting regulations apply.

"Migratory Birds" are defined in § 10.12, as meaning any bird, irrespective of its origin and whether or not raised in captivity (Attachment 2), which belongs to a species listed in §10.13, for the purpose of protection under the Migratory Bird Treaty Act (MBTA). Mallards are among those species listed and, as defined, captive-reared mallards are protected under the

MBTA and may be shot only in accordance with hunting regulations governing the taking of mallard ducks.

Regulations in § 21.13 allow captive-reared mallards, provided they are properly marked prior to 6 weeks of age by removal of a hind toe, banding with a seamless metal band, pinioning, or tattooing, to be possessed and disposed of *except by shooting* in any number, at any time, by any person, without a permit. When so marked, such birds may be killed by shooting only in accordance with all applicable hunting regulations governing the take of mallard ducks from the wild, *with the exception* that such birds may be killed by shooting, in any number, at any time, within the confines of any premises operated as a shooting preserve under State license, permit, or authorization (Attachment 3).

## **BACKGROUND**

### **Historical Perspective**

Interest in shooting captive-reared mallards on shooting preserves increased dramatically during the mid-1980s when numbers of wild ducks declined and hunting regulations became more restricted to protect breeding populations. Private landowner on Maryland's Eastern Shore became increasingly frustrated with this loss of hunting opportunity associated with the Federal requirement to take free-flighted (free-ranging situations) captive-reared mallards within seasons and bag limits set for wild mallards. In October, 1985 (Attachment 4), the Service was asked to send a letter to the Maryland Department of Natural Resources (DNR) to confirm the policy applying to shooting preserves (Maryland's terminology is Regulated Shooting Areas or RSAs) pursuant to regulations § 21.13. At that time, Maryland's regulations specified that the harvest of captive-reared mallards that were released free-flighted could only occur within the regular daily State-wide bag limits set in accordance with Federal regulatory frameworks (seasons and daily bag limits) established for wild mallards.

The Service responded to the Maryland DNR in a letter dated October 28, 1985, indicating that regulations contained in § 21.13 do apply to the confines of any premises operated as a shooting preserve under State license, which would allow captive-reared mallards

to be killed by shooting, in any number, at any time of year (Attachment 5). However, this letter noted that "Wild birds may be killed in such situations only in circumstances that fully comply with the provisions of 50 CFR, Section 20, particularly Section 20.21(f) relating to live decoys, and Section 20.21(i) concerning baiting" and further noted that "full compliance with those laws may be difficult if captive-reared mallards are being fed or used as live decoys."

In a follow-up letter dated November 21, 1985, the Maryland DNR indicated that as a result of this interpretation by the Service, it intended "to issue RSA licenses to individuals who wanted to release captive-reared mallards in a free-flighted condition on their property" (Attachment 6). This interpretation of § 21.13, allowing "free-flighted" mallards to be taken in any number, at any time on shooting preserves is now recognized as de facto Service policy, but was never officially stated as such. However, as a result of this broader interpretation of § 21.13, interest in releasing and shooting free-flighted, captive-reared mallards on shooting preserves expanded rapidly. The number of RSA permits in Maryland (including existing tower shoots) increased from 15 in 1985 to 132 in 1990 (Smith and Rohwer 1997).

Previously, shooting preserves taking captive-reared mallards in any number under regulations in § 21.13 were operated as "tower shoots." This method of release was most cost-effective, since most birds were either shot immediately or survivors gathered up and contained for a subsequent release. In these situations, precautions were taken to control captive-reared mallards and prevent them from intermingling freely with wild ducks. This method ensured that few birds, if any, escaped to the wild, thus minimizing any possible effect on wild populations. However, under the new policy interpretation, shooting preserves releasing free-flighted mallards had an opposite effect, as much greater numbers (tens-of-thousands) of captive-reared mallards were released, fewer were shot directly, and the survivors allowed to wander freely off the premises increasing the potential to mix with wild ducks.

The Service prepared a fact sheet in 1986 providing information to the public regarding regulations governing the hunting of captive-reared mallards (Attachment 7). The information provided by the Service indicated that a conflict with Federal regulations, i.e. live decoys and



baiting, could result when captive-reared and wild ducks are both present and hunted on the same premises operated as a licensed shooting preserve.

### **Management Agency Involvement**

As controversy surrounding the practice of releasing captive-reared mallards on shooting preserves intensified in the late 1980s and early 1990s, the four Flyway Councils and the International Association of Fish and Wildlife Agencies made several requests urging that the Service conduct a thorough review of all the information available and to clarify the biological, regulatory, and enforcement conflicts pursuant to the management of migratory waterfowl (Attachment 8). The Service held a meeting attended by State and Federal personnel on November 10, 1988, at the Patuxent Wildlife Research Center, Laurel, Maryland, to begin exploring the potential conflicts and management implications caused by the rapidly expanding interests in releasing large numbers of captive-reared mallards on shooting preserves. During the 1988-89 hunting season, more than 100,000 mallards were released for shooting on shooting preserves in Dorchester County, Maryland.

Because of concerns for the potential introduction of disease, alteration of wild-stock genetics, confounding of management and data-collecting efforts, and conflicts with regulations prohibiting baiting and live decoys, the Service proposed to review the regulations governing the release and harvest of captive-reared mallards on State-licensed shooting preserves in February 1992 (57 FR 43868). On June 1, 1993, the Service published a "Notice of Intent" (58 FR 31247) to inform the public of potential conflicts arising from these activities by providing background information and to invite comments (Attachment 1). Although the Service initiated the review and solicited input from State wildlife agencies and the public, the effort was suspended because of provisions attached to the 1994 Congressional Appropriations Bill requesting the Service to withhold promulgation of any new regulations until further studies were completed (Attachment 9). Accordingly, the Service suspended its review in March 1994.

The International Association of Fish and Wildlife Agencies, at its annual meeting in September 1999 (Attachment 10), and all four Flyway Councils by joint recommendation in July

2000 (Attachment 11), urged the Service to resume its review of the possible adverse effects of releasing captive-reared mallards into the wild for hunting purposes. Since the studies referenced in the language of the 1994 Congressional Appropriations Bill had concluded, the Service agreed to this request and published in the *Federal Register* on August 28, 2001 (66 FR 45274) a NOI to resume its review of § 21.13. The Service asked the Flyway Councils to assist with this review by providing information about the number of shooting preserves, those releasing captive-reared mallards, and the methods used in releasing mallards for shooting (Attachment 12). In addition, the Service requested information from its Regional Offices about the effects of captive-reared mallard releases occurring near National Wildlife Refuges or other Federal Lands, and from its Division of Law Enforcement regarding conflicts with enforcement of hunting regulations and the take of both wild and captive-reared mallards in areas where they come into close proximity, either on shooting preserves or adjacent habitats.

### **Legal Interpretation**

To investigate the various jurisdictional rulings regarding the status of captive-reared mallards under the MBTA, the Service requested a legal opinion from the Solicitor's Office (Attachment 13). Specific questions related to (1) whether such birds are protected as "migratory birds" under § 10.12, and (2) whether such birds become "wild" when released in free-flighted situations and property rights are relinquished. On March 7, 1991, a Service regulations technician concluded in an internal memorandum (Attachment 14) that captive-reared mallards were "migratory birds" by definition in § 10.12, and therefore are a protected class; however, they were not the class specifically intended as wild for protection under the MBTA. There appears to be a clear distinction made between the full protection afforded wild ducks and the regulatory authority extended to captive-reared mallards merely to limit the direct effects on migratory populations within the public domain (e.g., issues concerning baiting, live decoys, prevention of disease).

To further address the question of protection under the MBTA and explore whether this protection changes when captive-reared mallards are released in free-flighted situations, several

legal cases have been cited (Attachment 14), mainly Koop v. United States, 296 F.2d 53 (1961), United States v. Richards, 583 F.2d 491 (1978), and United States v. Conners, 606 F. 2d 269 (1979). The interpretation of these cases points to the notion that captive-reared mallards are not within the protection afforded those species in the MBTA, but § 10.12 and its reference to § 10.13 include such birds raised in captivity as “migratory birds,” thus they may be regulated under the MBTA by the Secretary of the Interior and administered by the Service. Furthermore, in the Service’s internal memorandum (Attachment 14), the distinction is made that, if captive-reared mallards have no immediate effect on migrating wild populations of waterfowl, they are of no consequence to the Service when shot for sport. However, the obligation of the Service is assumed whenever such birds do affect migrant populations protected under the MBTA. In particular, the Service’s responsibilities could be affected whenever these indistinguishable classes conflict with harvest management and hunting regulations development, law enforcement issues associated with existing baiting and live-decoy regulations, and the potential for transmission of disease between these groups. Finally, the Service memorandum concluded that the Secretary has the authority to promulgate regulations to meet these concerns and it seems prudent to do so if there is any questions that wild mallard populations might be adversely affected by captive-reared mallards.

The issue of control, or whether property rights are relinquished when captive-reared mallards are released in free-flighted situations is raised in Koop v. United States. In this case, the court found that once Dr. Koop (the owner) released captive-reared mallards to the wild (free-flighted) they were no longer under his control and no longer his property, and thus, reverted to *ferae naturae* and property rights were destroyed. However, this issue has not been specifically litigated in case law, so questions regarding ownership are vague (Attachment 14). It is not clear whether such birds, released free-flighted for shooting on premises operated as shooting preserves, become “wild” for protection under the MBTA. Also, questions about what constitutes “release of control”, or whether ownership is retained following free-flighted releases, have not been resolved, but clearly are relevant.

## **LSU Study Results**

In 1989, a study proposal was submitted to the Service by Dr. Frank Rohwer, originally with the Appalachian Environmental Laboratory, University of Maryland System, Frostburg, Maryland, now with Louisiana State University, for partial funding to examine the survival, movements, habitat use, and pairing chronologies and interactions with other waterfowl (Attachment 15). This study was initiated in 1991 and received support from the Service, Maryland DNR, The Grand National Waterfowl Hunt Club, and The Past Shooters Association.

Results of the 3-year study conducted by Louisiana State University on RSAs in Maryland are described in a 1999 Ph.D. Dissertation by David Smith (Attachment 16) and a paper published in the 1997 Transactions of the North American Wildlife and Natural Resources Conference by Smith and Rohwer (Attachment 17). The main objective of this study was to better understand the ecology of captive-reared mallards released in Maryland using radio-telemetry technology. The study examined two main components of captive-reared mallard releases in Dorchester County, Maryland: (1) Maryland's State-release program and (2) private releases on RSAs. Results from the State-release program indicated that less than 30 percent of the captive-reared mallards survived to the opening of the hunting season, largely because of nutritional deficiency. As a direct result of these findings, this program was discontinued by the Maryland DNR in 1993 for reasons of cost-effectiveness (Hindman et al. 1992, Smith and Rohwer 1997).

Mallards released free-flighted on RSAs survived at rates exceeding 80 percent because of an active feeding program and managed habitats on the RSAs. Dispersal distances varied depending on habitat available in proximity to the source RSA. Ducks released on RSAs composed primarily of marsh habitat moved farther and had larger home ranges than those released on sites with more upland characteristics. Also, Smith (1999) documented considerable movement of captive-reared mallards among other RSAs and between RSAs and the Blackwater National Wildlife Refuge by radio-tracking. Observations of captive-reared mallards pairing with American black ducks (*Anas rubripes* - hereafter black ducks) or wild mallards were largely inconclusive. Pairing appeared to be highly assortative (mating occurred more often within

specific groups than among groups) between black duck and mallards (either wild or captive-reared) and between captive-reared and wild mallards. Although Smith (1999) found a preference for assortative pairing rather than interspecific pairing between captive-reared mallards and black ducks, these findings were not gathered during the breeding season when most hybridization occurs through forced copulation or pairing during re-nesting.

Based on releases in Dorchester County, Maryland, the LSU study provided some valuable insights into the survival, movements, and interspecific pairing of captive-reared mallards with wild mallards and black ducks. However, because a sample of wild ducks was not also marked with telemetry or external markers, it is not possible to compare movements, usage of RSAs, or evaluate the extent of interactions between captive-reared mallards and wild waterfowl, which is a central issues of this review. Nevertheless, these results do indicate that interactions between these groups are common on RSAs in Maryland. Smith (1999) determined by direct observation of the bands that a substantial proportion of mallards on RSAs were captive-reared (47 %), and only a small proportion (11 %) were wild, but a large number were undetermined (42 %). From the sample of paired females of captive-reared origin, 86 percent were paired with males of the same origin while 13 percent were paired with wild male mallards. The proportion of wild mallards on RSAs increased from 2 percent in October to 25 percent in February. However, on Blackwater National Wildlife Refuge, the proportion of wild mallards decreased dramatically in January and February, while the number of mallards overall increased based on Refuge counts (Smith and Rowher 1997). This indicates an influx of captive-reared birds on to the Refuge from surrounding RSAs in late winter.

#### **CURRENT STATUS**

In May 2001, the Service sent a questionnaire concerning captive-reared mallard releases (Attachment 18) to the wildlife agencies in the 48 contiguous States and Alaska. This questionnaire was distributed to the States through the Flyway Councils. Responses were compiled and used to estimate the extent and magnitude of captive-reared-mallard releases across the United States. Because of the number of shooting preserves in the Maryland, more detailed

information was gathered from the records of the Maryland Department of Natural Resources. Additionally, a series of questions (Attachment 19) was sent to the Service’s Regional Offices to determine what impacts were occurring on National Wildlife Refuges or other public lands.

**State-Agency Responses**

Seventy percent of the State-licensed shooting preserves in the United States occur in the Atlantic and Mississippi Flyways (Table 1). Fewer than 10 percent of these preserves release captive-reared mallards for shooting. The greatest proportion of licensed shooting preserves releasing captive-reared mallards (> 85 %) occurs in the two eastern Flyways, mostly the Atlantic Flyway (~64 %).

Table 1. Number of licensed shooting preserves and number of preserves releasing captive-reared mallards, by Flyway (estimates for 2001 or most recent year).

Flyway	Number of licensed shooting preserves		Number of licensed shooting preserves releasing captive-reared mallards		
	Number	No response <sup>a</sup>	Number	Unknown <sup>b</sup>	No response <sup>a</sup>
Atlantic	1,946	1	202	0	0
Mississippi	1,325	0	69	1	0
Central	902	0	6	1	0
Central/ Pacific <sup>c</sup>	249	0	32	0	0
Pacific	209	0	5	0	1
Total	4,631	1	314	2	1

<sup>a</sup> Number of States that did not include a response to this question.

<sup>b</sup> Number of States that indicated that they did not have records to answer this question.

<sup>c</sup> States that are divided between the Central and Pacific Flyways, i.e., Montana, Wyoming, Colorado, and New Mexico.

Of the shooting preserves releasing captive-reared birds in the Atlantic Flyway, 70 percent use free-flighted releases whereas only 16 percent use the more traditional tower-release methods (Table 2). In the Mississippi Flyway, 63 percent of the shooting preserves utilize tower releases and only 15 percent release free-flighted birds. Ninety percent of all free-flighted release operations occur in the Atlantic Flyway. There were relatively few licensed shooting preserves

that release captive-reared mallards reported in the Central and Pacific Flyways, and all were tower release operations (Table 2).

Table 2. Number of licensed shooting preserves using tower, free-flighted, and other release methods, by Flyway (estimates for 2001 or most recent year).

Flyway	Release method				States w/o data <sup>b</sup>
	Tower	Free-flighted	Other <sup>a</sup>	Unknown	
Atlantic	29	126	3	23	1
Mississippi	26	6	9	0	4
Central	0	1	0	2	3
Central/Pacific <sup>c</sup>	0	4	0	0	1
Pacific	0	3	0	0	0
Total	55	140	12	25	9

<sup>a</sup> In the Atlantic Flyway, these operations hand throw or use "launchers" to release birds. In the Mississippi Flyway, a "hybrid" method where birds are kept on a home pond, captured before the shoot, released, and allowed to fly to their home pond.

<sup>b</sup> Number of States that indicated that they did not have records to answer this question.

<sup>c</sup> States that are divided between the Central and Pacific Flyways, i.e., Montana, Wyoming, Colorado, and New Mexico.

In the Atlantic Flyway, the estimated number of captive-reared mallards released annually in free-flighted situations is similar to the numbers released from tower-release operations (Table 3). However, 53,000 birds released in New York could not be classified by release method. Most of these releases probably were controlled, tower-release operations, since most shooting preserves are located in upstate New York, which would not be conducive to maintenance of free-flighted flocks (B. L. Swift, New York Department of Environmental Conservation, personal communication). In the Mississippi Flyway, the clear majority of birds released annually on shooting preserves is from tower-release operations. Estimates of the numbers of captive-reared mallards released on shooting preserves in the United States exceeds 300,000 annually, of which more than 200,000 birds (~60 %) are released in the Atlantic Flyway. Actual numbers likely are higher because records from several States are not available.

Table 3. Number of captive-reared mallards released on licensed shooting preserves using tower, free-flighted, and other release methods, by Flyway (estimates for 2001 or most recent year).

Flyway	Release method				States w/o data <sup>b</sup>
	Tower	Free-flighted	Other <sup>a</sup>	Unknown	
Atlantic	74,732	83,223	2,300	53,413	1
Mississippi	33,963	3,300	10,710	0	4
Central	0	100	0	32	3
Central/Pacific <sup>c</sup>	0	0	0	4	2
Pacific	0	10,000	0	0	0
<b>Total</b>	<b>108,695</b>	<b>96,623</b>	<b>13,010</b>	<b>53,449</b>	<b>10</b>

<sup>a</sup> See footnote a, Table 2.

<sup>b</sup> Number of States that indicated that they did not have records to answer this question.

<sup>c</sup> States that are divided between the Central and Pacific Flyways, i.e., Montana, Wyoming, Colorado, and New Mexico.

At least 60 percent of the harvest on shooting preserves is derived from the tower-release method and is consistent between the two eastern Flyways (Table 4). Also, harvest data from shooting preserves are not readily available for nearly 25 percent of the States.

Table 4. Number of captive-reared mallards harvested on licensed shooting preserves using tower, free-flighted, and other release methods, by Flyway.

Flyway	Release method				States w/o data <sup>b</sup>
	Tower	Free-flighted	Other <sup>a</sup>	Unknown	
Atlantic	56,142	33,431	1,140	36,900	1
Mississippi	19,663	1,399	8,131	0	6
Central	0	0	0	0	3
Central/Pacific <sup>c</sup>	0	0	0	0	2
Pacific	0	8,000	0	0	0
<b>Total</b>	<b>75,805</b>	<b>42,830</b>	<b>9,271</b>	<b>36,900</b>	<b>12</b>

<sup>a</sup> See footnote a, Table 2.

<sup>b</sup> Number of States that indicated that they did not have records to answer this question.

<sup>c</sup> States that are divided between the Central and Pacific Flyways, i.e., Montana, Wyoming, Colorado, and New Mexico.



The apparent harvest rates (number harvested/number released) differed by release method (Table 5). A higher percentage (~70 %) of the birds released from tower settings were harvested than those released in free-flighted situations (~44 %). Thus, the harvest rate of tower-released birds was about 1.5 times that for free-flighted birds. Harvest rates for the birds released in New York with “Unknown” release methods (and for 10,000 unclassified releases in the Mississippi Flyway) are more similar to those for tower-released birds than free-flighted released birds (Table 5), which lends support to the contention that these likely were tower-type releases.

Table 5. Harvest rates of captive-reared mallards released and harvested on licensed shooting preserves using tower, free-flighted, other, and unknown release methods, by Flyway.

Flyway	Tower	Free-flighted	Other <sup>a</sup>	Unknown
Atlantic	0.751	0.402	0.496	0.691
Mississippi	0.579	0.424	0.759	N/A
Central	N/A	0.000	N/A	0.000
Central/Pacific <sup>b</sup>	N/A	N/A	N/A	0.000
Pacific	N/A	0.800	N/A	N/A
Total	0.697	0.443	0.713	0.690

<sup>a</sup> See footnote a, Table 2.

<sup>b</sup> States that are divided between the Central and Pacific Flyways, i.e., Montana, Wyoming, Colorado, and New Mexico.

In accordance with the statutes outlined in § 21.13, most States across the country (69 %) allow licensed shooting preserves to harvest captive-reared mallards outside of their regular duck-season dates. However, nearly 15 percent of the States did not respond to this question (Table 6). Most States (61%) did not limit the location of licensed shooting preserves relative to the distribution of migratory ducks (Table 7). Some States specifically prohibited the operation of shooting preserves on or near natural wetland habitats and prohibited the attraction of wild waterfowl to the premises. Recent regulatory changes in Maryland no longer permit RSAs to release or feed birds on tidal wetlands. Several States indicated that they have adopted State laws either prohibiting the releases of captive-reared mallards on shooting preserves or strictly

regulating their release and harvest methodology. However, many States commented that they did not have good records or closely track the release and harvest of captive-reared mallards.

Table 6. State responses, by Flyway, to the question: "Do you permit shooting preserves to harvest captive-reared mallards in any number, at any time, including outside the regular duck season for wild ducks?"

Flyway	Yes	No	No response <sup>a</sup>
Atlantic	11	4	2
Mississippi	13	0	1
Central	5	1	0
Central/Pacific <sup>b</sup>	1	1	2
Pacific	4	2	2
Total	34	8	7

<sup>a</sup> Number of States that did not include a response to this question.

<sup>b</sup> States that are divided between the Central and Pacific Flyways, i.e. Montana, Wyoming, Colorado, and New Mexico.

Table 7. State responses, by Flyway, to the question: "Do you limit the locations of shooting preserves releasing captive-reared mallards relative to the distribution of wild ducks?"

Flyway	Yes	No	Not applicable <sup>a</sup>	No response <sup>b</sup>
Atlantic	2	13	2	0
Mississippi	5	7	1	1
Central	1	4	1	0
Central/Pacific <sup>c</sup>	0	3	0	1
Pacific	2	3	1	2
Total	10	30	5	4

<sup>a</sup> Number of States that indicated that this question is not applicable, e.g. they do not allow release of mallards.

<sup>b</sup> Number of States that did not include a response to this question.

<sup>c</sup> States that are divided between the Central and Pacific Flyways, i.e. Montana, Wyoming, Colorado, and New Mexico.

The majority (73%) of State wildlife agencies viewed the practice of releasing captive-reared mallards for hunting as negative (Table 8). Twenty-one percent of the States were neutral, and 6 percent had no position, indicating that this practice was not a "hot topic" in their State and the issue had not been addressed. No State agency reported a positive view of these practices.

Table 8. State responses, by Flyway, to the question: "Does your State agency view captive-reared mallard releases as positive, negative, or neutral?"

Flyway	Positive	Neutral	Negative	No position
Atlantic	0	2	13	2
Mississippi	0	3	11	0
Central	0	1	4	1
Central/Pacific <sup>a</sup>	0	3	1	0
Pacific	0	2	6	0
Total	0	11	35	3

<sup>a</sup> States that are divided between the Central and Pacific Flyways, i.e., Montana, Wyoming, Colorado, and New Mexico.

Only 10 percent of State responses indicated documented cases of disease transmission associated with captive-reared mallard releases. Eighty-eight percent indicated no documented cases and 2 percent indicated no records (Table 9). Although there was little evidence of captive-reared mallards acting as disease carriers, a large majority of the 49 State responses cited disease threats as their primary concern, particularly as the practice of releasing captive-reared mallards has become more widespread.

Table 9. State responses, by Flyway, to the question: "Have there been any documented cases of disease problems associated with captive-reared mallards released in your State?"

Flyway	Yes	No	Unknown <sup>a</sup>
Atlantic	3	14	0
Mississippi	2	11	1
Central	0	6	0
Central/Pacific <sup>b</sup>	0	4	0
Pacific	0	8	0
Total	5	43	1

<sup>a</sup> Number of states that indicated that they did not have records to answer this question.

<sup>b</sup> States that are divided between the Central and Pacific Flyways, i.e., Montana, Wyoming, Colorado, and New Mexico.

Similarly, only 15 percent reported documented law-enforcement problems, 81 percent documented no problems, and 4 percent did not respond (Table 10). The most frequent enforcement problems cited by States involved violations associated with live decoys, baiting, over-bagging of wild ducks, and shooting of wild ducks after the hunting season had closed.

Nationwide, 73 percent of the State responses favored more restrictive Federal regulations to control the release of captive-reared mallards into the wild for shooting, and 10 percent did not. Six percent of States had no position, and 2 percent either did not respond to this question or were unsure of their position on this question (Table 11). Support by several States for more restrictive Federal regulations was, however, contingent upon the States and other parties collaborating in the development of these regulations, and that these regulations focus more specifically on reducing the interactions between captive-reared mallards and wild waterfowl. A few States commented that they would favor better clarification of the Federal regulations regarding the release of captive-reared mallards on shooting preserves.

Table 10. State responses, by Flyway, to the question "Do you have any information pertaining to enforcement problems associated with captive-reared mallard releases?"

Flyway	Yes	No	No response <sup>a</sup>
Atlantic	5	12	0
Mississippi	3	11	0
Central	0	5	1
Central/Pacific <sup>b</sup>	0	4	0
Pacific	0	7	1
Total	8	39	2

<sup>a</sup> Number of States that did not include a response to this question.

<sup>b</sup> States that are divided between the Central and Pacific Flyways, i.e., Montana, Wyoming, Colorado, and New Mexico.

Table 11. State responses, by Flyway, to the question: "Does your agency favor more restrictive Federal regulations controlling the release of captive-reared mallards into the wild for shooting?"

Flyway	Yes <sup>a</sup>	Neutral	No	No position	No response <sup>b</sup>	Unknown <sup>c</sup>
Atlantic	15	0	1	1	0	0
Mississippi	10	1	2	1	0	0
Central	5	0	0	1	0	0
Central/Pacific <sup>d</sup>	2	1	1	0	0	0
Pacific	4	1	1	0	1	1
Total	36	3	5	3	1	1

<sup>a</sup> Several States indicated that support for more restrictive Federal regulations was conditional.

<sup>b</sup> Number of States that did not include a response to this question.

<sup>c</sup> Number of States that indicated that they did not have information to answer this question.

<sup>d</sup> States that are divided between the Central and Pacific Flyways, i.e., Montana, Wyoming, Colorado, and New Mexico.

Several State responses expressed concern regarding genetic introgression or contamination of the wild-mallard gene pool, and interbreeding with black ducks and mottled ducks, particularly when free-flighted captive-reared birds migrate or intermingle with wild stocks. In addition to the negative impacts associated with hybridization with wild birds, they

cited concerns that captive-reared mallards escaping from shooting preserves often become feral, creating nuisance problems and further exacerbating disease potential and public menace.

Although most States were not opposed to the practice of shooting captive-reared mallards on shooting preserves, they were strongly opposed to releasing these birds into the wild. A few States commented that this practice sends the wrong message regarding game management (i.e., a “quick fix”), and detracts from habitat management and protection programs that remain the key factors in maintaining healthy and viable waterfowl populations.

### **Maryland**

Maryland has the largest number of shooting preserves, or Regulated Shooting Areas (RSAs), that release and shoot captive-reared mallards. Currently, there are 18 commercial and 60 noncommercial shooting preserves in operation, mostly located on Maryland’s Eastern Shore of Chesapeake Bay. Each preserve must be at least 200 acres in size to qualify under State regulations. Of the 78 shooting preserves, 59 release mallards in a free-flighted condition, whereas 19 use the more traditional tower-release method. In Dorchester County, there are 3 commercial and 40 noncommercial shooting preserves, which is the highest concentration in the State. This county is an important breeding and wintering area for many migratory waterfowl and encompasses significant State and Federal wildlife habitat, including Fishing Bay Wildlife Management Area and Blackwater National Wildlife Refuge, respectively. As a result of the close proximity of these areas, free-flighted captive-reared mallards and wild ducks readily intermix (Smith 1999). Between 1985 and 1990, more than 100,000 captive-reared mallards were released annually on shooting preserves in Maryland (Table 12). However, since the early 1990's, these numbers have declined by more than 60 percent. The apparent harvest rate obtained from records received from each shooting preserve in Maryland seems to indicate that less than 40 percent of the captive-reared mallards released are harvested. These low harvest rates suggest that large numbers of captive-reared mallards survive the hunting season and likely carry over to the next season (80% survival rate estimated by Smith 1999). Thus, the actual carryover between years (number of captive-reared mallards using any specific shooting preserve or free-ranging

outside these preserves) is considerably higher than the number reported being released per year. Also, these records indicate that 2,000 or more wild ducks, mostly mallards, black ducks, green-winged teal, and wood ducks, are shot on these preserves annually during the regular duck season.

Table 12. Estimates of number of captive-reared mallards released from the Grand National Waterfowl Association (GNWA) and from the Maryland Department of Natural Resources' (MD DNR) Regulated Shooting Area (RSA) survey, and estimates of number of captive-reared mallards killed on RSAs in Dorchester County from the MD DNR RSA survey.

Year	GNWA release figures	MD DNR Survey of RSAs		
		Release	Harvested	Apparent harvest rate
1981	37,200			
1982	43,750			
1983	63,500			
1984	97,500			
1985	106,200			
1986	120,000			
1987	122,250			
1988	117,500			
1989	110,750			
1990	106,000			
1991	98,000			
1992	78,800	23,825	7,092	0.298
1993	49,500	24,025	6,889	0.287
1994		40,741	16,973	0.417
1995		26,275	10,182	0.388
1996				
1997				
1998		29,392	10,490	0.357
1999		37,057	15,418	0.416
2000		25,431	10,428	0.410
Totals	1,150,950	206,746	77,472	0.375

## **National Wildlife Refuges**

A query of the Service's Regional Offices to determine whether National Wildlife Refuges (refuges) are being adversely affected by releases of captive-reared mallards from shooting preserves, either impacting their mission to provide habitat for wild ducks or their operational management practices, indicated that most refuges are generally not influenced by mallard releases on shooting preserves. Only Region 4 (Southeast) and Region 5 (Northeast) responded that certain refuges have reported concerns regarding the presence of captive-reared mallards from nearby shooting preserves or other properties releasing mallards to supplement their hunting. Several refuges in South Carolina and North Carolina reported that captive-reared mallards from adjoining properties interfere with their operational banding program and population surveys. Also, several refuges in the mid-Atlantic region are located in close proximity to shooting preserves and reported receiving considerable usage from captive-reared mallards. For example, Blackwater Refuge in Maryland and Bombay Hook Refuge in Delaware each estimated upwards of 1,000 captive-reared mallards using these refuges annually. They indicated that these birds did affect their duck-banding operations and population surveys. Some Refuges indicated concerns about pairing with wild mallards, interbreeding with black ducks and mottled ducks, and exploiting habitats for wild ducks.

## **POTENTIAL AREAS OF CONFLICT**

### **Disease Transmission**

Different diseases are prevalent in wild and captive birds (Davidson & Nettles 1995), and activities that promote interactions between these groups have the potential to increase disease risks to wild populations. Therefore, when captive-reared birds are released free-ranging into the wild, there exists at least some risk of transmission of diseases to wild populations. Captive-reared birds represent a "biological package" of micro-organisms including disease organisms that can enter the environment (Davidson and Nettles 1995). Diseases that affect captive-reared birds are likely to affect wild birds because of the close phylogenetic relationship of these groups (Wobeser 1981).



A major disease of concern in relation to the release of captive-reared mallards is duck plague or duck virus enteritis (Davidson and Nettles 1995). Duck plague is caused by a herpes virus that has a single antigenic serotype. However, field strains can vary in their virulence and ability to produce disease or cause death in waterfowl (Jansen 1961 *in* Wobeser 1981, Spieker et al. 1996). The disease was first confirmed in the United States in the commercial duck industry on Long Island, New York in 1967. Since then it has been reported in captive and feral waterfowl in 20 states and 4 Canadian provinces (Friend 1999). The greatest frequency of reports each year comes from Maryland and Virginia (Converse and Kidd 2001).

Duck plague is transmitted by direct contact with infected birds or contact with the contaminated environment, especially contaminated water (Wobeser 1981). The virus is more resistant to inactivation in protein-rich environments, especially at lower ambient temperatures. Under laboratory conditions the viral infectivity of tissue suspensions were found to be stable at -20° C (Jansen 1968) and there is a gradual decline in infectivity to non-detectable levels over 30 days at 22° C (Dardiri 1975). Using more natural environmental conditions in the laboratory, including lake water from the Lake Andes National Wildlife Refuge, in South Dakota, the site of a major duck-plague die-off in 1973, duck plague was shown to maintain virus infectivity of added virus for more than 30 days at 4° C (Wolf and Burke 1982). However, the persistence of the virus in the natural environment, in tissues of dead birds, or in the excretions and secretions of infected birds is largely unevaluated (Wobeser 1981). Susceptibility to duck plague varies among species, with blue-winged teal (*Anas discors*) being highly susceptible and northern pintails (*Anas acuta*) only slightly susceptible (Spieker et al. 1996).

Typical of other herpes viruses, duck plague virus establishes a carrier state in waterfowl that survives primary infection (Burgess et al. 1979). Experimentally and naturally infected carrier waterfowl have been shown to periodically shed virus year-round for years when maintained under laboratory conditions (Burgess et al. 1979). Results of a summer survey of waterfowl in Maryland in 1998 suggests that virus-shedding occurs naturally in the waterfowl populations examined, even in the absence of reported mortality [W. Hansen and K. Converse,

National Wildlife Health Center (NWHC), unpublished data]. There was a noticeable decline in cloacal virus-shedding over the summer months of June to August, similar to the seasonal shedding fluctuations reported for experimental carrier mallards (Burgess and Yuill 1983). It is not known if carriers shed enough virus to infect healthy birds (Burgess et al. 1979), but this is thought to be the primary cause of infection and disease transmission in susceptible birds (Friend 1999).

Only 3 major duck-plague outbreaks among migratory waterfowl have been reported in the United States. The first occurred in 1967 on Flanders Bay, Long Island, New York. Mortality was reported in black ducks (89), mallards (19), Canada geese (*Branta canadensis* [1]), and bufflehead (*Bucephala albeola* [1]). The second occurred in 1973 at Lake Andes NWR, in South Dakota, where an estimated 42,000 mallards, 270 Canada geese, and lesser numbers of other species died (Pearson and Cassidy 1979). The latest occurred in 1994, when approximately 1,200 waterfowl carcasses (mostly black ducks and mallards) were recovered in the Finger Lakes region of western New York (Friend 1999).

The sub-lethal effects of duck plague virus infection on waterfowl, such as increased risk of predation or other behavioral or physiological changes that may affect survival or reproduction, are unknown. However, Burgess and Yuill (1981) demonstrated decreased hatchability of eggs laid by persistently infected mallard hens. There is no information available on the effects of sub-clinical persistent duck-plague virus infections in other species of wild waterfowl, or any waterfowl at the population level.

Duck plague has not been shown to be enzootic in free-ranging, migratory waterfowl in North America (Brand and Docherty 1984, 1988, Friend 1999). Failure to demonstrate duck plague or antibodies in migratory waterfowl (Brand and Docherty 1984, 1988), and the association of all outbreaks of duck plague in migratory waterfowl with captive or feral birds have been used in the argument that captive and feral populations are the primary reservoir of duck plague in North America (Friend 1999; files, Atlantic Flyway Representative's Office, U.S. Fish and Wildlife Service). Captive-reared waterfowl often remain more concentrated than wild

waterfowl, even after release. These higher densities of waterfowl provide a greater potential for duck plague, when present, to be transmitted quickly between individual birds, establishing a high prevalence of infection. This reservoir of duck-plague virus provides a greater risk to wild waterfowl. Evidence to support this scenario was provided by a study of waterfowl on Maryland's Eastern Shore in 1998. Duck-plague virus shedding or exposure (presence of neutralizing antibodies) was found in 32 percent of mallards raised in captivity, either locally or imported as ducklings and released for hunting, compared to 8 percent of the free-flying mallards sampled from the surrounding area (W. Hansen and K. Converse, NWHC, unpublished report). The presence of duck-plague virus was also detected in 17 percent of the free-flying Canada geese examined from Blackwater Refuge in 1998, and 29 percent in 2000, which is located near shooting preserves where captive-reared mallards were also found positive for duck-plague virus.

However, the status of duck plague in wild populations is poorly understood and controversial. The association of most duck-plague outbreaks in the wild with occurrences in captive flocks does not necessarily indicate direction of transmission, and methods used in past surveys of migratory waterfowl were not able to detect infections in carrier birds, if present (Brand and Docherty 1988, Friend 1999). Circumstantial arguments have been made that migratory waterfowl are the primary distribution agent of the virus to captive, feral, and migratory populations across the continent (Pearson and Cassidy 1997). Although the arguments presented by Pearson and Cassidy (1997) raise the possibility that duck plague is established in wild populations, other plausible interpretations of their evidence leads to an equivocal conclusion about the status of duck plague in migratory waterfowl populations.

Even if duck plague is enzootic but occurring at low frequency in migratory waterfowl, the release of carrier birds into the wild may increase the presence of the virus (or other disease agents) to the point where major mortality events from the disease become a concern. Also, physical stress brought about by higher concentrations may induce carrier birds to shed the virus (Burgess and Yuill 1983). Because captive-reared mallards and wild birds mingle during the late

summer and into the hunting season, there is potential to increase the transmission of the virus to wild birds.

The lack of information about the extent to which the duck-plague virus exists in wild populations remains a major impediment to assessing the threat that duck plague among captive-reared mallards poses to wild waterfowl populations. Previous studies were unable to demonstrate the presence of duck plague in wild waterfowl, possibly because of limitations in techniques available at the time (Brand and Docherty 1984, 1988, Friend 1999). More modern techniques are currently available to assess duck plague in wild populations, and additional studies are proposed by Hansen and Converse (NWHC, unpublished report) pending funding.

Although large numbers of captive-reared mallards have been released in a free-ranging condition on shooting preserves on Maryland's Eastern Shore (primarily in Dorchester County) for over 15 years, a major epizootic event involving wild birds has not been recorded. However, a high frequency of duck plague has occurred in private back-yard flocks in Maryland where a mix of different species are kept, including one farm producing mallards for shooting preserves (Maryland DNR records). Two sites in Maryland, one in Baltimore County and another in Queen Annes County, where duck plague has occurred in the past, continue to be under quarantine and subject to annual inspection.

Several isolated die-offs commonly occur annually at specific sites in the mid-Atlantic States. These situations suggest that crowding or environmental conditions may be important contributing factors for the initiation of die-offs. Little information exists regarding the disease threat posed by duck plague from free-ranging captive-reared birds intermingling with wild birds during the hunting season.

One indication that duck-plague virus transmission may be occurring naturally from captive-reared waterfowl to wild birds is the detection of duck-plague modified-live-virus vaccine in wild waterfowl (W. Hansen and S. Nashold, NWHC, unpublished data). A wild mallard shedding the vaccine virus was collected along with captive-reared mallards shedding duck-plague field virus at a release site in Kent County, Maryland. Although the captive-reared

mallards were not detected shedding the vaccine virus at that site, they were found to be shedding the vaccine virus at a nearby site in the same county and at four collection sites in Dorchester County, including Blackwater National Wildlife Refuge. Canada geese sampled at the Blackwater National Wildlife Refuge have also been found shedding the vaccine virus. The vaccine is only approved and licensed by the U.S. Department of Agriculture for use in domestic waterfowl but has been used to limit outbreaks in zoological collections (Sandhu and Leibovitz 1997, Montali et al. 1976). In Britain, a wild mallard was found shedding duck-plague vaccine strain when sampled at a facility that uses the vaccine annually to protect several hundred of their ornamental waterfowl (W. Hansen and S. Nashold, NWHC, unpublished data). Wobeser (1981:5) felt certain that transmission of diseases occurs in both directions between captive-reared and wild waterfowl. However, the high prevalence of the duck-plague virus among the captive-reared mallards that were tested and the tens-of-thousands of these free-ranging mallards that are released into relatively small areas each year, particularly in Maryland, do pose a potential heightened health risks to wild birds.

### **Genetic Diversity and Hybridization**

Another concern of biologists and resource-managers about the release of captive-reared mallards is the potential to introduce gene-linked traits that reduce fitness under natural conditions to populations of wild mallards (Banks 1971, Shoffner 1971, Smith 1999). Although largely speculative, the concern is that captive-reared mallards from various game-farm stocks may interbreed with wild mallards and adversely affect the wild characteristics of the native stock. Studies comparing these different mallard strains indicate that differences in egg production, fertility, growth rates, and body weights may be linked to genetic differences (Prince et al. 1970, Greenwood 1975). Such studies relied on breeding and back-crossing experiments to determine the genetic nature of these differences, but differences between these groups were not determined with molecular-genetics techniques. It would be difficult to do so, as it is not known which genes control such traits (M. D. Sorenson, Department of Biology, Boston University, personal communication).

Game-farm mallard hens began egg-laying earlier, laid for a longer time, laid larger clutches, and had greater incubation time than wild hens bred in captive breeding situations (Prince et al. 1970, Greenwood 1975, Cheng et al. 1980). Cheng et al. (1980) felt that these differences might explain the frequent reproductive failure of released mallards. They reasoned (Cheng et al. 1980:1974-1975) that these traits led to improper timing of migration and nest initiation (resulting in ducklings hatching before environmental conditions permitted good survival) and that large clutch size and decreased broodiness could be the cause of a high rate of nest and brood abandonment.

The flow of genes from captive-reared to wild mallards, and thus the likelihood of introducing "nonadaptive" traits to wild populations, depends in part on the extent of interbreeding between the strains. The extent of interbreeding that occurs, in turn, depends on the time of release, area of release, age of the birds when released, composition of the released flocks (Cheng et al. 1979:424), and mating behavior of the strains. Cheng et al. (1978) found that, in captive conditions, both wild and game-farm mallard drakes preferred mates of their own strain, if they were raised with their own kind. When drakes were raised with hens of the opposite strain, this preference became less pronounced. Mallard hens preferred or paired with drakes they were raised with, regardless of whether the drakes were from wild or game-farm strains (Cheng et al. 1978). Thus, there may be barriers related to courtship behaviors that could limit the mixing of wild and game-farm mallards (Cheng et al. 1979). Greenwood (1975) has pointed out that interactions between game-farm and wild mallards may be different in wild situations than in pen-rearing situations.

Smith (1999) reported a similar assortative (like-kind) mating pattern among wild and game-farm mallards released in Maryland. However, the origin of only 47 percent of 4,960 mallards observed could be determined and only 23 percent of the known-origin hens were observed to be mated. Of those hens, 13 percent ( $n = 124$ ) of captive-reared mallard hens paired with wild drakes and 24 percent ( $n = 95$ ) of wild mallard hens paired with captive-reared drakes (Smith 1999:52). Although these findings support the idea that the majority of mallard pairings

were assortative, nearly one-quarter of the matings of wild hens were with captive-reared drakes, which suggests that a considerable amount of intermixed mating does occur. Also, the mate choice of most (77 %) of the known-origin hens was not determined.

Another major concern related to the release of captive-reared mallards is their potential to contribute to hybridization with, and genetic swamping of, mallard-like species. The magnitude of the threat of hybridization to mallard-like species is illustrated by the status of the New Zealand gray duck (*A. superciliosa superciliosa*). In the 1860s mallards were introduced to New Zealand and produced reproductively viable hybrids with the native gray duck (Haddon 1984, Gillespie 1985). By 1981-82, 51 percent of one mallard/gray duck population appeared to be hybrids based on morphology, and only 4.5 percent pure gray duck (Gillespie 1985). Subsequent genetic analysis suggested that hybridization may be more extensive than previously thought (Rhymer et al. 1994).

Probably the most widely-known instance of mallard hybridization in North America involves the black duck. The mallard was considered a wanderer or occasional visitor in most of the northeastern United States from the beginning of the twentieth century (Heusmann 1974, 1991). Over the past 100 years, mallard numbers in the northeastern United States and Canada have increased as western populations expanded eastward into traditional black duck nesting range (Johnsgard and DiSilvestro 1976, Heusmann 1991). Also, there were large-scale release programs in several states, mainly New York (1946-52; Foley et al. 1961), Pennsylvania (1951-1982; Dunn et al. 1995), and Maryland (1974-1987; Hindman et al. 1992), where mallards were raised and released to augment declining duck populations.

Concurrent with mallard intrusion into black duck breeding and wintering range, black duck populations have declined (Johnsgard and DiSilvestro 1976, Rusch et al. 1989, Serie 1990). Although the nature of the relationship between mallard expansion and black duck decline is uncertain (Ankney and Dennis 1988, Ankney et al. 1987, 1988, Conroy et al 1989, Ankney et al. 1989, Merendino et al. 1993), the release of game-farm mallards may add competition pressure on black duck populations, including the increased likelihood of hybridization.

Black ducks and mallards are nearly identical genetically (Ankney et al. 1986, Ankney and Dennis 1988, Hepp et al. 1988, Avise et al. 1990). Although hybridization between these species is well documented (Johnsgard 1960, Heusmann 1974), the consequences of genetic introgression are uncertain (Cade 1983). Plumage-coloration traits of hybrids are detectable and have been well described (Kirby et al. 2000). However, detection becomes increasingly difficult as backcrossing with parent stocks increases (Phillips 1915 *in* Heusmann 1974), and the net effects on survival, reproduction, and behavioral characteristics of hybrids and backcrosses are less well known. These performance traits are key parameters relating directly to the status of black ducks and have adaptive significance to various habitats and landscapes preferences.

Mallards and black ducks do hybridize and the offspring of such matings are fertile (Phillips 1915 *in* Heusmann 1974). Morgan et al. (1984) reported hybrid frequencies of mallards and black ducks above the frequencies expected from random mating in Maryland (49%) and Massachusetts (62%). In contrast, D'Eon et al. (1994) reported a 2 percent hybridization rate in New Brunswick, Canada, and Smith (1999) found a hybridization rate of 1 percent from observational surveys on the Eastern Shore of Maryland. From bag-checks of hunters, Smith (1999) reported 8.4 percent hybrids.

However, the dynamics of mallard-black duck hybridization are uncertain. Mixed pairing during winter was observed frequently by Brodsky and Weatherhead (1984) near Ottawa, Ontario, Canada and by Heusmann (1974) in Massachusetts. Brodsky and Weatherhead (1984) found that male mallards courted female black ducks only when all female mallards were paired. In the Chesapeake Bay area of Maryland, little mixed pairing appears to occur, and mixed pairing could not account for observed hybridization rates (Morton 1998, Smith 1999). D'Eon et al. (1994) felt that mixed pairings likely were responsible for the hybridization rates that they observed in New Brunswick. However, these studies cover limited geographic areas in relation to both the wintering and breeding ranges of the black duck.

Forced copulation is another route that could produce hybrids. Forced copulation is a common reproductive strategy in wild mallard males, but infrequently observed in black duck



males (McKinney et al. 1983 *in* Morton 1998). Seymour (1990) found a low frequency of attempted and successful interspecific forced copulation in Nova Scotia, Canada, but concluded that the frequency was much greater than expected given the dispersed distribution of the breeding populations. Captive-reared male mallards may have an even greater tendency toward forced copulation because the breeding systems used in captivity tend to select for those males that force-copulate rather than pair (McKinney et al. 1984 *in* Morton 1998). Thus, the release of large numbers of captive-reared mallards into areas with limited black duck breeding populations may pose a serious threat.

In Florida, hybridization with feral mallards is seen as the major threat to the State's mottled duck (*A. fulvigula fulvigula*) population (Moorman and Gray 2001). Florida's population of mottled ducks is estimated at only about 28,000 birds in spring, and about twice that number in fall (Johnson et al. 1991). It is nonmigratory (Moorman and Gray 1994) and genetically isolated (McCracken et al. 2001). Presently, 5 percent of Florida's mottled duck population exhibits mallard-like plumage characteristics (Gray 1993). This situation in Florida is directly attributed to the release of captive-reared mallards, either as pets or from shooting preserves, and subsequent establishment as resident breeders. The hybrid offspring from crossbreeding are fertile because mottled ducks and mallards are closely related. Because of this genetic introgression, the Florida Fish & Wildlife Conservation Commission has taken management action to protect the mottled duck as a discreet entity by prohibiting all further releases of free-ranging captive-reared mallards.

### **Waterfowl Management Programs**

Management of migratory waterfowl in North America is dependent upon a series of coordinated surveys and other monitoring programs to assess the status of waterfowl and to determine what public-use opportunities exist, including regulated hunting opportunities. Each year, waterfowl managers representing Federal, State, and Provincial wildlife agencies, as well as a few private conservation organizations such as Ducks Unlimited, Inc, review and analyze biological information from both operational and special data-gathering activities to assist them in

conserving migratory waterfowl populations at satisfactory levels. This information is used to promulgate hunting-season frameworks, to justify purchase and management of important habitats, and to guide activities among various joint ventures coordinated under the North American Waterfowl Management Plan (U.S. Fish and Wildlife Service et al. 1998). There are concerns among biologists and resource-managers about how and to what extent large-scale releases of free-ranging, captive-reared mallards on shooting preserves confound these databases and conflict with management efforts by public wildlife agencies to protect wild populations and make informed decisions regarding their welfare.

*Midwinter Waterfowl Surveys.* – The Midwinter Waterfowl Survey (MWS), initiated in the 1930s, is the longest-term source of information on wintering waterfowl populations in the United States. Its principal objectives are to obtain annual indices of winter abundance for certain species or populations and to assess changes in distributions. The survey is a cooperative effort that relies heavily on State and Federal involvement throughout most of the United States. The potential conflict between this survey and the release of captive-reared mallards arises from the fact that the MWS is largely an aerial survey and can not differentiate between captive-reared and wild mallards from the air. Fewer than half of the mallards released in free-flighted conditions on shooting preserves are harvested (Table 12) each year. Consequently, large numbers of captive-reared mallards are carried over year-to-year and are likely counted when the MWS is conducted in early January.

On Maryland's Eastern Shore where MWS zones and segments encompass several shooting preserves, large numbers of captive-reared mallards are recorded in the survey (Maryland DNR, personnel communications). These counts comprise an increasing proportion of Maryland's total mallard index since the expansion of shooting preserves in the late 1980s (Fig. 1) and are included in the Atlantic Flyway mallard totals. Thus, the release of large numbers of free-flighted captive-reared mallards into areas historically surveyed as part of the MWS confound the data used by biologists and managers to inform them about the status and trends of wild mallards at the State and Flyway levels. Over time, these biased indices of abundance and

distribution may influence the capabilities of wildlife agencies to prescribe appropriate management strategies. For example, in the early 1990s, the rapidly growing resident Canada goose population masked the precipitous decline in the Atlantic Population (AP) of Canada geese, which eventually led to a closure of the hunting season to protect the migrant Canada geese in the Atlantic Flyway.

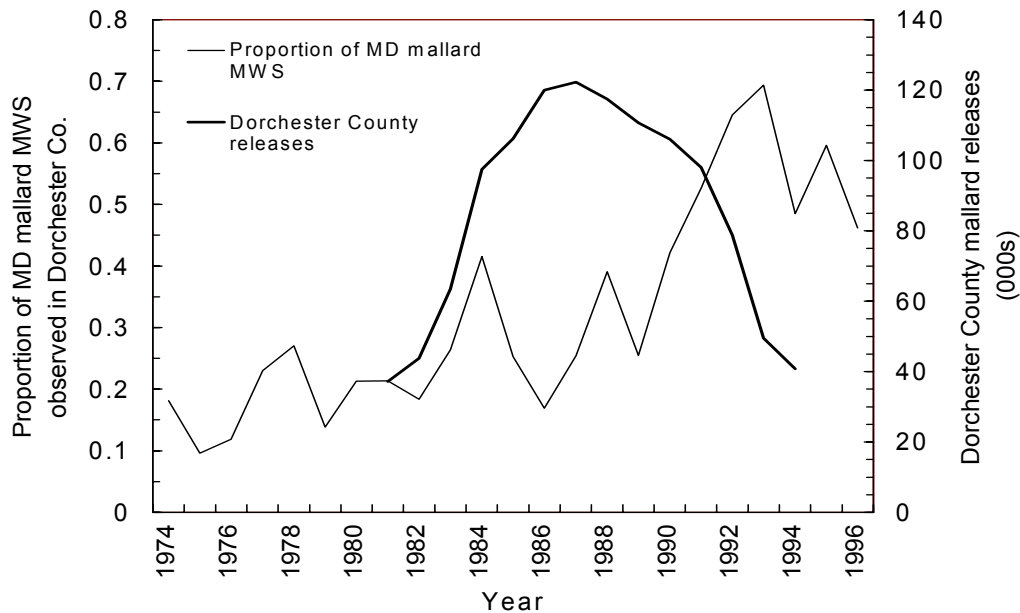


Figure 1. Proportion of mallards observed in Dorchester County during the Maryland Midwinter Waterfowl Survey (1974-1996) and number of captive-reared mallards released in Dorchester County (1984-1994).

File source: *dabblers mws.xls*

*Waterfowl Breeding Population Surveys.* – The release of free-flighted captive-reared mallards into areas where States annually conduct waterfowl breeding-population surveys may result in another source of bias. In 1989, several States in the Northeast and Mid-Atlantic Regions, including Vermont, New Hampshire, Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, Maryland, and Virginia, established waterfowl breeding-pair surveys (Heusmann and Sauer 2000) to improve knowledge of eastern mallard populations. Results of these surveys are combined with mallard population estimates derived from the Service’s May aerial surveys in North-central States, Western and Eastern Canada, and Maine and are used in the Adaptive Harvest Management (AHM) process to set hunting regulations for duck seasons

(U.S. Fish and Wildlife Service 2001). In addition, large-scale releases of captive-reared mallards at specific locations would almost certainly influence the results of the Breeding Bird Survey conducted by the U.S. Geological Survey (USGS, Patuxent Wildlife Research Center, Laurel, Md).

*Banding Programs.* – Information from the leg-banding and recovery of migratory waterfowl is an important management tool used by Federal/State/Provincial wildlife agencies and researchers to assess distributions, harvest pressure, and survival rates, and to evaluate the effects of hunting regulations on wild waterfowl. The bird-banding program in North America is jointly administered by the USGS Bird Banding Laboratory (BBL; Patuxent Wildlife Research Center, Laurel, MD) and the Bird Banding Office of the Canadian Wildlife Service (Ottawa, ON, Canada). These agencies issue permits and uniquely-coded bands to banders and maintain records of species and numbers banded and records of bands recovered by hunters or recoveries obtained from birds recaptured or found dead.

Large-scale releases of banded captive-reared mallards may affect reporting rates of bands on wild ducks near release sites. Reporting rates tend to be lower near sites where large numbers of Federally-banded ducks are marked, presumably because of a loss of "novelty" among hunters about shooting banded birds (Henny and Burnham 1976). The suppression of band-reporting rates caused by the increased frequency of harvesting banded birds makes Federal banding programs less efficient, so more ducks must be banded to get reliable information. This potential bias in reporting rates adds uncertainty to harvest-rate estimates for wild mallards, which affects the development of annual hunting regulations and, more specifically, the population models used in the AHM process.

Each year, hundreds of recoveries of non-Federal bands (private bands) are reported to the Federal agencies in both the U.S. and Canada and thus interfere with agency operations (BBL, USGS, personal communication). Although BBL staff can often distinguish non-Federal bands from written band reports, staff time is required to respond to the reporting party and explain that the band is not official and that no information is available from the BBL. Recoveries of

non-Federal bands reported by telephone can also be distinguished by BBL staff, but again, valuable staff time is used to process a band report that provides no useful information. These reports have become so frequent that the BBL has developed a form letter to send to those reporting non-Federal bands. Some individuals become quite argumentative when informed that the BBL has no information about the banded bird, insisting that as the Federal agency in charge of banding, they have the responsibility for those bands (Processing Supervisor, BBL, USGS, personal communication).

When the BBL began use of an answering service to accommodate overflow calls from the 1-800-327-BAND reporting system, these bands were usually not distinguished from valid reports and many errors were introduced into the database that had to be tracked down and corrected manually, consuming more staff time (Processing Supervisor, BBL, USGS, personal communication). The inscription and number on some private bands so closely resembles those used on Federal bands that they are routinely missed in the data-editing procedures (Chief, BBL, USGS, personal communication). Thus, inaccuracies are introduced into a database critical to the management of wild birds.

*Harvest Surveys.* – Waterfowl harvests are estimated annually by the Service from a Hunter Questionnaire Survey (HQS) and a Parts Collection Survey (PCS), which sample approximately 50,000 hunters each year and collect more than 80,000 waterfowl parts (wings and tails) from hunters to assess the species, sex, and age composition of the harvest (Carney 1992). At least some captive-reared mallards shot on shooting preserves or adjacent properties are reported in the HQS and wings are submitted to the PCS (Chief, Harvest Surveys Section, USFWS, personal communication). In a study of Maryland's now discontinued release program, Hindman et al. (1992) found that alula-clipped wings of the Maryland DNR's released birds accounted for an average of 13.9 percent of immature mallard wings and 3 percent of the total duck wings submitted to the PCS from Maryland.

Because there is no reliable technique to distinguish captive-reared mallards from wild mallards based on wings submitted to the PCS or from a hunter's response to the HQS, at least

some captive-reared mallards from shooting preserves are reported in the total harvest estimate. Hunters frequently shoot captive-reared mallards that move off of shooting preserves that are also included in the samples for the HQS and PCS. Although, wings of capture-reared mallards can sometimes be distinguished from those of wild mallards, these judgements are subjective and inconsistent. Therefore, the degree of bias is difficult to assess and likely is not consistent through time.

The problems associated with captive-reared mallards introducing bias into the U.S. harvest-surveys database is probably greatest in the Atlantic Flyway, where there are greater numbers of shooting preserves that release free-ranging birds. In general, captive-reared mallards included in harvests reported in the HQS inflates the estimates of wild-mallard harvests, but equally important, they also affect the harvest estimates for other species, since the species composition of the PCS wing sample is used to apportion the HQS duck-harvest estimate among species. Also, as the mallards being released on shooting preserves are largely young-of-the-year, these submissions to the PCS will inflate harvest age ratios (young per adult) and further bias inferences drawn from the harvest surveys.

### **INTERNATIONAL CONCERNS**

Protection of migratory waterfowl in North America is provided for by Conventions between the United States and Great Britain (for Canada), August 16, 1916; the United Mexican States, February 7, 1936 (amended March 10, 1972); Japan, March, 4, 1972; and the Russia, November 19, 1976. Further, these obligations to protect shared migratory bird populations are implemented in the United States under the Migratory Bird Treaty Act, July 3, 1918. Movement patterns of captive-reared mallards away from release sites have been well documented using leg-band recoveries in several studies (Dunn et al. 1995, Hindman et al. 1992, Smith 1999, Soutiere 1986, Wielicki 2001). Although most recoveries occur within close proximity to release sites, a smaller percentage (< 20 %) move considerable distances, usually indirect recoveries of males, to other States and Provinces of Canada. Hindman et al. (1992), Soutiere (1986), and RSA owners in Maryland have reported captive-reared recoveries occurring in several Provinces of Canada,

particularly from Ontario. This evidence suggests that some portion of the captive-reared mallards that survive the first hunting season will move longer distances (Dunn 1995) and are integrating into the wild migratory mallard population. As less than half of the captive-reared mallards released in free-flighted conditions are actually harvested on shooting preserves, the majority of these birds begin dispersing greater distances to surrounding areas or establishing migratory patterns similar to wild birds. Many are harvested elsewhere, but an undetermined proportion become established in the migratory population.

The Canadian Wildlife Service has expressed concern about the integration into wild populations of captive-reared mallards that escape from shooting preserves in the United States and migrate to Canada (Attachment 20). Canadian policy strictly prohibits any bird held under an Avicultural Permit to be shot or released from captivity to the wild without a written application. A written application is required to release wild-stock birds and must show qualifications, experience, and suitable facilities to propagate wild-stocks. Further, the applicant must demonstrate that his activities comply with an existing environmental review process and will not significantly affect wild stocks of birds or any other natural component. Canada is particularly concerned about the effects that mallards releases in the eastern U.S. could have on wild populations of black ducks breeding in eastern Canada.

### **LAW ENFORCEMENT ISSUES**

Under Federal regulations § 21.22(a), a permit is required to capture migratory birds for banding or marking or to use bands issued by USGS for banding or marking migratory birds. In addition, only official Federal bands may be used to mark migratory birds, and any other type of marker (including other bands) must be authorized in a banding permit in accordance with § 21.22(c)(1). Nevertheless, thousands of captive-reared mallards are banded with non-Federal bands and released every year on shooting preserves by private individuals and organizations in violation of Federal regulations. Also, regulations in § 21.13 (b)(3) clearly stipulate that captive-reared mallards are to be banded with a seamless band only, which is intended to prevent the removal and application of the band to wild waterfowl.

Captive-reared mallards released on shooting preserves in a free-flighted condition in areas frequented by wild ducks increases the potential for violations of Federal waterfowl hunting regulations. Under Federal provisions listed in § 21.13, hunters on shooting preserves are exempted from regulations set for wild ducks and allowed to take captive-reared mallards by shooting at any time of year and in any number. But if a hunter shoots a wild duck, all the requirements of the Federal hunting regulations apply to the taking of that duck. Thus, a closed-season violation [§ 20.22 and § 20.32], involving take or possession of wild ducks, will occur if a hunter shoots a wild duck outside the hunting season dates selected by a State for wild ducks. In these cases, a State must limit its shooting preserves, specified by licenses, to operate only during the period of take set for wild ducks in that State's regulations. Therefore, in these situations, regulations in § 21.13 conflict with regulatory frameworks set for wild mallards under the MBTA.

Hunters may also commit violations when wild ducks are taken on shooting preserves if the captive-reared birds that are present serve as live decoys under § 20.21(f), or if they exceed the daily bag limit of wild ducks in § 20.24. Live-decoy violations can occur when wild ducks are attracted to the presence or audible calls of captive-reared mallards on sites operated as shooting preserves. Also, some hunters may not be fully aware that any captive-reared mallard taken outside the premises of a shooting preserve must count towards their daily bag limit for wild ducks or that they may be put at risk by hunting within the "zone of influence" involving live decoys and/or taking with the aid of bait [§ 20.21(i)]. The legality of whether free-flighted captive-reared mallards released from one shooting preserve can be shot in any number on another shooting preserve in accordance with § 21.13 is unclear and should also be clarified.

Although the taking of captive-reared mallards on shooting preserves is exempted from Federal waterfowl hunting regulations by § 21.13, the potential for violations is greatly increased where free-ranging captive-reared mallards and wild ducks intermingle on the same premises (Attachment 21). In these situations, legal conflicts usually arise because hunters find it difficult or impossible to distinguish between captive-reared and wild mallards on the wing. Low light or poor weather can exacerbate problems with identification of other species of wild ducks, e.g.,



black ducks, pintails, and gadwalls (*Anas strepera*). Therefore, Federal regulations under § 21.13, permitting shooting preserves to operate at any time of year, and to take in any number, are seriously compromised whenever wild birds intermix with captive-reared mallards on the same premises. Federal regulations allowing the take of wild waterfowl are strict liability statutes [with the exception of the baiting regulation, § 20.21(i)], and do not require that the violator has knowledge of the unlawful situation. Waterfowl hunters who hunt near a shooting preserve may also experience increased liability due to the release of free-flighted captive-reared mallards. These ducks often “trade-up” between different shooting preserves and the surrounding areas, and thus the possibility of hunting by the use or aid of live decoys may exist if all the elements of the violation are present. Although each hunting situation are unique, some increased potential for violation usually exists for hunters that shoot both captive-reared mallards and wild ducks near a shooting preserve.

### **CONCLUSIONS**

While the intent of the regulation § 21.13 was to allow privately-operated shooting preserves unlimited opportunity to shoot captive-reared mallards, provided there is a clear distinction from wild mallards and other migratory waterfowl, the Service is obligated to safeguard migratory waterfowl protected under the MBTA. Therefore, it seems prudent that the Service consider regulations that sufficiently protect migratory waterfowl if there are adverse effects from captive-reared mallards. Although this issue is largely confined to the eastern United States, and predominately the Atlantic Flyway, the influx of large numbers of captive-reared mallards released annually in a free-flighted condition into areas inhabited by wild ducks has raised concerns by the Service, Flyway Councils, the IAFWA, and other conservation organizations.

Upon review, there is evidence of the potential for increased risks of disease transmission, genetic introgression and hybridization, confounding of established waterfowl-management databases, and potential for violations of existing regulatory statutes. However, more information is needed. The threat of disease transmission remains the primary concern among nearly all State wildlife agencies and there is circumstantial evidence that duck-plague outbreaks have been

associated with, and occur most frequently in, areas where the largest numbers of captive-reared mallards are being released. Further investigations are needed to answer the questions of whether duck plague exists in wild populations and the direction of transmission. But presently, in the absence of more research using modern techniques, there is circumstantial evidence of duck-plague vaccine virus spreading from captive-reared mallards to migratory waterfowl in Maryland. Although a major die-off has not occurred in Maryland, the threat exists and cannot be ruled out, especially when crowding and habitat conditions may be contributing factors. Isolated small scale die-offs from duck plague are common annually in Maryland.

The effects upon genetic diversity of, and hybridization with, wild ducks by captive-reared mallards is less dramatic and more difficult to quantify at the population level. Pairing and interbreeding of captive-reared mallards with wild mallards, black ducks, and mottled ducks have been documented. Further, adverse effects have been observed in local breeding black ducks in Maryland and mottled ducks in Florida. In these particular situations, care should be taken that the release of free-flighted captive-reared mallards does not further contribute to the decline of these species. Although Smith (1999) found a preference for assortative pairing rather than interspecific pairing between captive-reared mallards and black ducks, these data were not gathered during the breeding season when most hybridization commonly occurs through forced copulation or pairing during re-nesting. Nevertheless, it is prudent to avoid any potential for adverse effects of genetic introgression or hybridization with captive-reared mallards wherever possible.

Large-scale releases of captive-reared mallards in localized areas were found to have some undesirable impacts on waterfowl-management programs, e.g., population monitoring, banding, and harvest surveys designed to track the status and harvest of migratory waterfowl, mainly in the Atlantic Flyway, and particularly in Maryland. These effects, however slight, may impart additional bias into important databases used by public wildlife-management agencies to manage our waterfowl resources. The less effective these databases become, the more uncertainty these public agencies have in making informed decisions regarding population status and trends, habitat utilization, appropriate waterfowl hunting seasons, and other management issues.

Regulations governing shooting preserves [§ 21.13(b)(3)] stipulate that captive-reared mallards may be marked with a “seamless” metal band, presumed as a permanent marker. However, thousands of captive-reared mallards are banded with removable, non-Federal bands every year on shooting preserves by private individuals and organizations in violation of Federal regulations § 21.22 (c)(1). These bandings may have an influence on reporting rates for wild birds and an effect on population models used in the development of annual hunting regulations. Thus, the confounding influence of captive-reared mallards that are banded illegally should be actively discouraged wherever possible to ensure the accuracy and reliability of these databases.

When captive-reared mallards on shooting preserves are released in a free-flighted condition and allowed to intermingle with wild ducks, there is an increased potential for violations of Federal waterfowl hunting regulations involving live decoys, baiting, over-bagging, and take of wild ducks out-of-season. These violations occur both on-site and on properties adjacent to the shooting preserves. Some States do not allow their licensed shooting preserves to operate outside of the dates of their regular statewide duck-seasons because of the high potential for shooting wild ducks on these areas. These State restrictions may decrease the potential for violations, but they also reduce the number of days available to harvest captive-reared mallards permitted under Federal regulations in § 21.13. When season lengths for wild ducks are severely restricted, as they have been at times in the past to protect wild ducks, the days available to shoot captive-reared mallards on shooting preserves is also severely reduced.

The inability to distinguish between captive-reared and wild ducks while in flight and the potential for problems caused by misidentification, both on and off shooting preserves, are at the heart of law-enforcement issues regarding releases of free-ranging captive-reared mallards. Curtailing releases of free-flighted captive-reared mallards (preventing captive-reared mallards from being free-ranging on premises operated as a shooting preserve), or restricting the location of shooting preserves away from natural wetland habitats frequented by wild ducks, are identifiable ways to alleviate the intermixing with wild ducks and the majority of enforcement issues associated with captive-reared mallards.

The range of movements by free-flying captive-reared mallards greatly affects the potential for interactions with wild waterfowl, conflicts with management programs, and harvests by hunters on adjacent properties. Smith (1999) reported considerable movements among shooting preserves and between shooting preserves and the Blackwater National Wildlife Refuge (and presumably the Fishing Bay WMA), and that movements of captive-reared mallards were positively related to the size and habitat availability on the source shooting preserve. Also, evidence from other studies (Dunn et al. 1995) suggests that captive-reared mallards that survive the first year will move longer distances in succeeding years.

It is not clear whether property rights are relinquished once captive-reared mallards are released in a free-flighted condition and are no longer within the possession and control of the respective shooting preserve (Attachment 14). Under such conditions, does the status of captive-reared mallards change regarding regulatory statutes to that of a protected class (wild ducks) covered by the MBTA? Such mallards harvested by hunters outside the premises of a shooting preserve are subject to the regulatory statutes that apply to the taking of wild mallards. Also, property rights and regulatory statutes are unclear when free-flying captive-reared mallards released on one shooting preserve are then harvested on another shooting preserve.

The fact that many shooting preserves releasing free-flying, captive-reared mallards in Maryland are also actively managing their habitats by flooding food crops is further problematic. Such feeding and/or habitat-management practices on shooting preserves may attract wild ducks and thereby, increase the potential for conflicts with wild waterfowl. Some hunters have objected to shooting preserves attracting large numbers of wild waterfowl by feeding or by flooding various crops to provide food when the preserve is not hunted (Maryland DNR, personal communication). They maintain that these areas hold wild waterfowl, thus reducing hunting opportunity on surrounding properties. These situations usually occur in areas where shooting preserves that are allowed to release free-flighted mallards are permitted to operate in close proximity to habitats occupied by migratory waterfowl. This brings into direct question the appropriateness of the Federal statutes in § 21.13, which allows captive-reared mallards to “be killed by shooting, in any

number, at any time, within the confines of any premises operated as a shooting preserve under state license, permit, or authorization”, while coincidentally allowing shooting preserves to attract and harvest wild waterfowl protected under the MBTA and Federal/State statutes. If the ducks shot cannot be distinguished until retrieved and in-hand, there is a conflict in terms of what regulations are in effect at the time of shooting.

Our review suggests that the language of Federal regulation § 21.13 is ambiguous, particularly as it relates to release methods and control of captive-reared mallards on shooting preserves. Some corrective action should be taken to limit intermixing of captive-reared mallards with wild waterfowl populations. Also, more than 70 percent of the States favor more restrictive Federal regulations controlling the release of free-flighted captive-reared mallards on shooting preserves and to prevent them from entering the wild population. This lack of clear definition regarding regulations in § 21.13 was the basis for the series of correspondences between the Service (Attachment 5) and the Maryland DNR (Attachment 6) in 1985. This led to the de facto understanding that the Service would allow captive-reared mallards on shooting preserves to be released in a free-flighted condition and shot in any number, at any time of year under regulations in § 21.13. Previously, these shooting preserves were operated as “tower-shoots”, by which precautions were taken to control captive-reared mallards so they would not become free-ranging on these properties. If flights of captive-reared mallards were controlled to a confined area, as is the practice with "tower-shoots", the potential risk of violations and liabilities to hunters associated with the shooting of captive-reared mallards on or near these facilities would be reduced or alleviated. More importantly, however, it would minimize interactions with wild ducks and allow shooting preserves to operate outside the regular duck-season dates and without regard to daily bag limits, as the regulations in § 21.13 intended. Also, shooting preserves would operate more efficiently by harvesting a greater proportion of the birds they release annually. In most cases, less than half of the captive-reared mallards released from shooting preserves each year are harvested that same year, while the remainder are allowed to move about freely.

## **POSSIBLE OPTIONS**

1. Revise regulations in 50 CFR 21.13 to prohibit the release of captive-reared mallards on State-licensed shooting preserves in a free-flighted or free-ranging condition and require tower-type releases to maintain control and restrict movements of captive-reared mallards to on-site premises.

*Rationale:* Presently, regulations in § 21.13 (d) allowing properly marked captive-reared mallards to be taken in any number, at any time of year on State-licensed shooting preserves conflicts with hunting regulations governing the taking of mallard ducks from the wild on the same premises whenever releases of free-flighted or free-ranging birds result in intermixing and attracting other migratory waterfowl. Additionally, whenever these differing classes come into close contact, there exists an increased potential for disease transmission, hybridization with other species, reduced effectiveness of waterfowl-management programs, and violations of regulatory statutes.

2. Enforce banding regulations § 21.22(a) requiring shooting preserves that mark captive-reared mallards with bands other than a seamless band to possess a banding permit or comply with marking provisions under § 21.13(b)(3) allowing the use of seamless bands only.

*Rationale:* Current practices of banding captive-reared mallards on shooting preserves with a non-seamless band are in violation of existing Federal statutes. This illegal activity has the potential of adversely influencing band-reporting rates, thus reducing the ability of Federal and State agencies to manage this important migratory bird resource, especially the setting of hunting-season frameworks and the management of waterfowl harvests.

## **REVIEW COMMENTS**

### **Flyway Councils**

On July 16, 2002, the Service forwarded a letter with a preliminary draft copy of its review of captive-reared mallard regulations on shooting preserves to Frank Montalbano, Rebecca Humphries, Kirk Nelson, and Jay Lawson, Chairs of the Atlantic, Mississippi, Central, and Pacific Flyway Councils respectively, requesting their Councils' review and consideration (Attachment 22). The following comments and/or recommendations were received:

*Atlantic Flyway Council* - the Council forwarded a recommendation (with a letter) dated July 26, 2002, to the Service that endorses the conclusion and recommendations in the captive-reared mallard report and urged the Service to finalize the document and implement the recommendations (Attachment 23). Further, a second recommendation (with a letter) was also submitted to the Service requesting that the Service complete a review of the effects of releasing mallards or other duck species, on areas other than on licensed shooting preserves, on the management of wild waterfowl by July 1, 2003.

*Mississippi Flyway Council* - the Council forwarded a recommendation (with a letter) dated July 29, 2002, to the Service that endorses the recommendations made in the report and urged the Service to complete the report and adopt/enforce regulations prohibiting releases of any captive-reared species of waterfowl in a free-flying situation, including releases made outside licensed shooting preserves (Attachment 24).

*Central Flyway Council* - the Council forwarded a letter dated July 26, 2002, stating that they greatly appreciated the Service's efforts in compiling this comprehensive review and believed that a final report would address their concerns as previously expressed in a recommendation dated July 10, 1993 and Joint Flyway Recommendation dated July 28, 2000. Upon completion of the report, they encouraged the Service to make necessary changes in 50 CFR to prohibit the practice of releasing captive-reared mallards in a free-ranging condition for purposes of shooting on State-licensed shooting preserves in order to

adequately protect our wild migratory bird resources and migratory bird hunting (Attachment 24).

*Pacific Flyway Council* - The Council forwarded a recommendation (with a letter) dated July 26, 2002, reaffirming its recommendation submitted to the Service in July 1993 that the Service ban by rule all free-flying, captive-reared mallard release programs. They cited numerous concerns regarding adverse effects to wild populations of waterfowl and expressed deep concern about many biological, social, and ethical issues associated with this questionable practice (Attachment 26).

### **International Association of Fish and Wildlife Agencies (IAFWA)**

On August 6, 2002, the Service forwarded a preliminary draft copy of its review of captive-reared mallard regulations on shooting preserves to Mr. Robert McDowell, president, IAFWA, requesting a thorough review and welcomed any comments and recommendations regarding its contents (Attachment 27). The Service presented an update on this subject at IAFWA's September 2002 meeting, Big Sky, MT. This issue is currently under review and comments and/or recommendations from IAFWA are pending.

### **Canadian Wildlife Service**

Comments were received from Dr. Steve Wendt, Chief, Migratory Birds Conservation, Canadian Wildlife Service, in a letter dated August 26, 2002 (Attachment 20). These comments supported the evidence of potential adverse effects contained in the Service's report but stressed the point that even the simple probability of their occurrence is enough to warrant control measures because of the seriousness of the effects to wild birds. However, he noted that this review and conclusions are relevant to releases of any kind and encouraged the Service to broaden its view and implement policy and regulations that will prevent the release or escape of captive-reared waterfowl of all species into wild populations. Further, he commented that while some organizations and individuals wish to increase hunting opportunity artificially, a sustainable long-term visionary approach is to improve the quality and distribution of waterfowl habitat in North America.



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**LIST OF ATTACHMENTS**

Attachment	Title
1	Notice of Intent to review the release of captive-reared mallards, 1 June 1993 (58 FR 31247-31249)
2	Code of Federal regulations, Title 50, Part 10, Sections 11 and 12
3	Code of Federal regulations, Title 50, Part 21, Section 13
4	Letter dated October 4, 1985 from Representative John Breau to Ronald Lambertson, Acting Deputy Director, U.S. Fish and Wildlife Service
5	Letter dated October 28, 1985 from Ronald Lambertson to Donald E. MacLauchlan, Director of the Maryland Forest, Park, and Wildlife Service
6	Letter dated November 21, 1985 from Donald E. MacLauchlan to Ronald Lambertson
7	Draft "Fact Sheet on Hunting Captive Reared Mallards" prepared by the U.S. Fish and Wildlife Service in response to a request from Congressman Beryl Anthony
8	Requests and recommendations from the Flyway Councils and International Association of Fish and Wildlife Agencies for the Service to conduct a review of captive-reared mallard releases
9	Memorandum from the Deputy Director, U. S. Fish and Wildlife Service to the Director of Regulatory Affairs, U. S. Fish and Wildlife Service announcing the postponement of the review of captive-reared mallard releases
10	Letter from the International Association of Fish and Wildlife Agencies to the Director, U. S. Fish and Wildlife Service urging the completion of the Service's review of captive-reared mallard releases
11	Letter from the National Flyway Council to the Chief, Division of Migratory Bird Management, U. S. Fish and Wildlife Service urging the completion of the Service's review of captive-reared mallard releases
12	Letter to the Chairman, National Flyway Council, requesting that the Council query state agencies about captive-reared mallard release programs in their states
13	Request to the Service's Office of the Solicitor for an opinion on the legal status of captive-reared and released mallards
14	Regulations technician's opinion on the legal status of captive-reared and released mallards
15	Proposal cover letter and abstract from Dr. Frank Rowher for a study of the effects of releases of captive-reared mallards.
16	Title page and abstract of the Ph. D. dissertation resulting from the study of the effects or releases of captive-reared mallards
17	First page and abstract of: Smith, D. B., and F. C. Rohwer. 1997. Perceptions of releases of captive-reared mallards with emphasis on an intensive program in Maryland. Transactions of the North American Wildlife and Natural Resources Conference 62:403-411.
18	Questionnaire concerning releases of captive-reared mallards sent to state waterfowl biologists

Attachment	Title
19	Questionnaire concerning releases of captive-reared mallards sent to Service regional offices
20	Letter from the Canadian Wildlife Service concerning the release of captive-reared waterfowl and supporting regulations
21	Memorandum from Assistant Director for Law Enforcement, U. S. Fish and Wildlife Service, regarding the release of free-flighted captive-reared mallards and their influence on the enforcement of the MBTA
22	Transmittal letter to Frank Montalbano, Chair, Atlantic Flyway Council, requesting Council review of and comments on the preliminary draft of the Service's review of captive-reared mallard releases on licensed shooting preserves
23	Atlantic Flyway Council recommendation concerning the Service's review of captive-reared mallard releases on licensed shooting preserves and recommendation to review also releases off shooting preserves
24	Mississippi Flyway Council recommendation and comments on review of captive-reared mallard releases on licensed shooting preserves
25	Central Flyway Council recommendation and comments on review of captive-reared mallard releases on licensed shooting preserves
26	Pacific Flyway Council recommendation and comments on review of captive-reared mallard releases on licensed shooting preserves
27	Transmittal letter to Robert McDowell, President, International Association of Fish and Wildlife Agencies requesting review of and comments on the preliminary draft of the Service's review of captive-reared mallard releases on licensed shooting preserves