

# USDA APHIS Wildlife Services Employs Cooperative Partnerships and Use of Alternative Capture Methods to Retrieve Flighted Birds Affected by Oil on the Delaware River

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## ABSTRACT

The availability and success of different tools and methods to capture birds affected by spilled oil is influenced by weather conditions, type of oil, bird species involved, time of year, safety considerations, environmental/habitat factors, and legal/policy issues of the agencies and organizations involved in rescue efforts. We describe a cooperative effort between the USDA APHIS Wildlife Services (WS) program and several Federal, State and private entities to capture oiled birds during the *Athos I* oil spill response. On November 26, 2004, the *Athos I* struck a submerged object while preparing to dock at a refinery in Paulsboro, New Jersey. This collision resulted in two holes in the vessel's tanks, and approximately 265,000 gallons of heavy Venezuelan crude (sweet, low-aromatic) spilled into the Delaware River ecosystem. Early in the wildlife rescue efforts, traditional capture methods such as the use of nets and capture by hand were having limited success because most of the birds were still capable of flight.

In December 2004, the U.S. Fish and Wildlife Service (USFWS) and the U.S. Coast Guard (USCG) requested that WS assist in wildlife recovery efforts at the *Athos I* incident. Birds of concern, primarily Canada geese (*Branta canadensis*), were capable of flight and occurred throughout a broad and diverse landscape complex in and around the Philadelphia metropolitan area. In most cases, the flocks contained a mixture of oiled and clean birds and were evading initial capture attempts with traditional methods.

Wildlife Services worked in partnership with Federal and State agencies and Tri-State Bird Rescue and Research, Inc. (Tri-State) to capture birds for rehabilitation. Wildlife Services used alpha-chloralose (AC, an FDA-controlled avian immobilizing agent that is delivered to recipient birds in baits), cannon nets, net guns, and hand capture to collect 190 Canada geese, 3 ring-billed gulls (*Larus delawarensis*), 2 domestic waterfowl, and 3 mallards (*Anas platyrhynchos*), during the period from December 2004 through February 2005. Our ability to mobilize quickly, establish landowner

access agreements, and employ use of regulated and specialized tools such as AC, cannon nets and net guns resulted in increased efficiency in capturing oiled birds. Each of these methods was most appropriate in different field situations encountered in this response. Their use was integrated into a flexible management approach to optimize capture success. Early concerns of the potential for AC to negatively affect birds already stressed by oil were addressed through consultation among WS researchers, Tri-State veterinarians, and State and Federal biologists, and through specialized observation, handling, rehabilitation and release of AC-caught birds. Biological considerations, and legal/policy issues and concerns were resolved through consultation and cooperation among affected agencies. The following are some of the benefits resulting from this cooperative approach: 1. availability of a wider variety of capture methods, 2. selectivity of methods and approaches, 3. ability to capture flighted birds early enough to permit their successful rehabilitation, and 4. efficiency in the capture of a larger number of birds than through traditional methods. Use of alternative capture methods, notably AC, by WS has not commonly occurred in oil spill responses. This cooperative effort should serve as a model for future incidents nationwide to ensure greater capture success and survival of affected birds through enhanced agency partnerships.

*Authors' Note: As of the date of this submission, the USFWS is still engaged in an investigation of the Athos I incident, and the total number and species of birds potentially affected by the incident are not reported in this document. This document reports on the activities conducted by WS during the incident.*

## INTRODUCTION

### Wildlife Services Program and Capabilities

USDA APHIS Wildlife Services (WS) is the Federal agency directed by law and authorized by the United States Congress to protect American resources from damage associated with wildlife. It is a cooperatively funded, service-oriented program that responds to requests for assistance in managing wildlife-related challenges through implementation of science-based integrated management programs. Wildlife Services' conservation efforts affecting migratory birds and other wildlife are carried out through operational management and research functions. Wildlife Services has staff and research expertise and capabilities related to wildlife capture for rehabilitation purposes and harassment/exclusion of wildlife and other animals from affected areas. Operational management is conducted by WS programs in states that partner with State and Federal Agencies, and other entities. The work described here was conducted by WS Programs in New Jersey, Pennsylvania, and Maryland/Delaware/District of Columbia. Wildlife Services' research function is coordinated through its National Wildlife Research Center (NWRC), based in Fort Collins, Colorado, and supported by Research Field Stations around the country. The NWRC Field Station in Sandusky, Ohio, provided technical support for the work

reported here, and has been instrumental in developing methods, such as AC, for wildlife management purposes.

### Traditional Wildlife Recovery Approaches in Oil Spill Response

Wildlife management activities associated with oil spills typically include hazing birds away from contaminated areas and the rehabilitation of oiled wildlife. In all spill responses, the rehabilitation of wildlife affected by oil is a legal mandate that is required by the Migratory Bird Treaty Act of 1918 as amended (16 USC 703 et seq, MBTA) and the Oil Pollution Act of 1990 (PL 101-380). In spill responses, the rehabilitation of oiled migratory birds is required of the responsible party, to avoid take under the MBTA. Rehabilitation of birds is usually done by wildlife rehabilitators with oversight from the USFWS. In spills where oil floats on the surface of the water for an extended period of time, hazing of birds away from these contaminated areas is a priority. However, in the *Athos I* situation, spilled oil did not persist on the surface of the Delaware River, oiled birds could still fly, winter was approaching, and uncatchable birds were likely to be out in the environment for weeks to come. Because oil did not persist for long on the surface, the capture and rehabilitation of flighted oiled birds took precedence over hazing birds away from contaminated sites. New approaches were needed to capture flighted oiled birds quickly. The safe capture and rehabilitation of oiled wildlife and the recovery of dead wildlife was the focus of the Wildlife Recovery Group.

### Wildlife Recovery Group Operations in the Delaware River Oil Spill, 2004-05

The Wildlife Recovery Group (WRG) operated under the Planning and Operations Sections of the Incident Command System (ICS), which was stood up immediately following the November 26, 2004 incident. The ICS was led by a Unified Command, consisting of the Federal on Scene Coordinator (FOSC, Captain of the Port of Philadelphia, U.S. Coast Guard, USCG), the Responsible Party (represented by the O'Briens Group) and representatives of NJ, PA, and DE. The WRG Leader was a USFWS representative responsible for wildlife recovery, rescue and rehabilitation activities, and for coordination with NRDA (Natural Resource Damage Assessment) personnel and Federal/State wildlife law enforcement officers. During the response, the States of NJ, PA, DE and USFWS recommended and received concurrence from Unified Command, to issue a voluntary refrainment of waterfowl hunting seasons in strategic areas, to reduce the likelihood of hunted flocks being hazed into oil-contaminated areas. Wildlife Services was initially requested to assist with hazing of waterfowl away from public drinking water supplies as well as to assist in the capture of oiled birds for rehabilitation. Due to the nature of the spill and behavior of affected birds, WS activities consisted mainly of capturing oiled birds for rehabilitation. The Unified Command was stood down on June 1, 2005, and a Maintenance and Monitoring Plan remains in effect until September 15, 2005.

## Wildlife Services Involvement in the Wildlife Recovery Group Operations

Pursuant to a request from the USFWS and the USCG, WS initiated involvement in the capture of oiled birds as part of the *Athos I* response on December 10, 2004. After development of a funding agreement between WS and the USCG, completion of environmental compliance documentation, consultation with Federal and State wildlife management agencies, and development of agreements with landowners for access and utilization of bird collection methods, field activities were initiated. Wildlife Services activities were conducted within the existing ICS structure, and occurred as part of the WRG. U.S. Fish and Wildlife Service leadership within the WRG provided WS with prioritized sites for capturing efforts. Daily briefings regarding birds observed and captured by WS were provided directly to WRG leadership. Wildlife Services activities consisted of capturing oiled birds and delivering them to the USFWS/Tri-State Bird Rescue and Research, Inc. (Tri-State).

## METHODS

### Administrative Processes

The WS program participated in the *Athos I* response under authority of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), which allows primary and support agencies such as the Department of Interior, Department of Agriculture, Environmental Protection Agency, and others to provide support to protect, conserve, preserve, rehabilitate, recover, and restore natural and cultural resources and historic properties threatened or affected by incidents of national significance, major disasters and emergencies. In December 2004, an interagency cooperative service agreement was established between WS and the USCG prior to fieldwork being conducted to outline agency roles and capabilities. Wildlife rehabilitation and recovery activities were conducted pursuant to two Federal laws: Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712; Ch. 128; July 13, 1918; 40 Stat. 755, as amended) and Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884, as amended). All migratory birds that were captured and transported by WS were authorized by permits issued and/or cosigned by the USFWS, the New Jersey Division of Fish and Wildlife, and the Pennsylvania Game Commission.

Federal agencies adhere to the National Environmental Policy Act (NEPA), which requires a public decision-making process that includes consideration of environmental implications of proposed and alternative actions. Pursuant to NEPA, WS completed a Categorical Exclusion (CE) record in early December 2004. The CE was developed through consultation among WS, USFWS, NJ Division of Fish and Wildlife, PA Game Commission, and DE Department of Natural Resources and Environmental Control. The CE documented that the proposal for WS to retrieve birds affected by the oil spill would not create negative impacts to the environment.

Wildlife Services provides direct management assistance and accesses properties pursuant to written authorization of the landowner, cooperators, other authorized officials, or in accordance with another agreement document such as a memorandum of understanding (WS Directive 2.101). A landowner access form (either an Agreement for Control of Animal Damage on Non-Private Property, WS Form 12C, or an Agreement for Control of Animal Damage on Private Property, WS Form 12A) was completed for each property prior to WS capture of oiled birds. Approvals were obtained from municipal police departments for use of certain methods, such as the net gun.

The current FDA-approved label for AC prohibits its use 30 days before or during the hunting season for free-ranging waterfowl, except in cases where the WS State Director, NWRC, USFWS and the State wildlife management agency (in this case, NJ Division of Fish and Wildlife and the PA Game Commission) collectively agree that the affected birds would not be part of a huntable population within 30 days of treatment. The timing of waterfowl hunting seasons in PA, DE, and NJ overlapped *Athos I* cleanup operations. The site-specific application of the AC-use restriction (including the determination of what constitutes "birds that could be hunted") is the responsibility of the WS State Director or the NWRC Director and the authorized AC user. Wildlife Services State Directors consulted with NJ, PA, and USFWS wildlife officials and documented concurrence to use AC to capture oiled birds in this case, provided that AC-caught birds would be held by Tri-State for 30 days prior to their release into the wild.

### Field Methods

Field methods employed by WS personnel included collection of birds with AC, cannon nets, net gun, and hand capture for delivery of captured birds to the USFWS/Tri-State.

#### *Alpha-chloralose*

Alpha-chloralose has been used as a sedative for animals since 1897 (Balis and Monroe 1964), and as a capture agent for bird species, including wild turkeys (*Meleagris gallopavo*, Williams 1966); marabou storks (*Leptotilos crumeniferus*, Pomeroy and Woodford 1976); American crows (*Corvus brachyrhynchos*, Stouffer and Caccamise 1991); American coots (*Fulica americana*), pigeons (*Columba livia*, Woronecki et al. 1992; Woronecki and Dolbeer 1994) and herring gulls (*Larus argentatus*, Seamans and Belant 1999). Alpha-chloralose has been registered and used for years in Great Britain, France, New Zealand, and Australia as an avicide (Woronecki et al. 1989).

Since 1992, the U.S. Food and Drug Administration has permitted the WS program to use AC as an Investigational New Animal Drug. This permission was granted after extensive laboratory and field trials were conducted with waterfowl, pigeons and coots by the WS program (Woronecki et al. 1990; 1992, Woronecki and Dolbeer 1994, Woronecki and Thomas 1995). Presently, AC is available for use in the

US to capture waterfowl, pigeons, ravens, and coots only by trained WS personnel or their designees.

Alpha-chloralose depresses the cortical areas of the brain and is converted to trichloroethanol, which depresses the central nervous system, thus causing respiratory depression and abnormally low blood pressure. Trichloroethanol combines with glucuronic acid in the liver to form the inactive compound urochloralic acid, which is then excreted (Lees 1972). At the dose level used by WS to capture birds, recovery from dosing usually occurs 8 – 24 hours after birds ingest AC.

Alpha-chloralose is typically used by WS to capture birds as part of an integrated wildlife management approach to reduce wildlife damage. Alpha-chloralose is available in powder and tablet forms. Tablets come in 3 sizes (20, 40, or 60 mg) and are pressed into a piece of bread in the proper combination to adequately dose a bird. When used in powder form, AC can either be applied to whole kernel corn (1 mg of AC/kernel of corn) or mixed with corn oil and injected into bread baits. In capturing birds affected by oil in this project, WS used bread baits, with either tablets or the powder/corn oil mixture. Bread baits were hand fed to oiled birds selected for capture and rehabilitation. Most oiled birds were captured within one hour of ingesting treated bait. Sedated birds were placed individually into transport boxes and delivered to the USFWS/Tri-State. All birds captured were held for 30 days in accordance with USDA AC-use guidelines.

#### *Cannon net*

Cannon nets were used to capture oiled birds that were wary of human presence or were present in large, flat, open areas. Cannon nets were 15 m x 7 m with a mesh size of 3 cm. Sites were baited with corn and bread to attract and position the birds to optimize capture. Wildlife Services personnel, located approximately 45 to 125 m away from the bait site, deployed the cannon net. The nets required at least two people to set up and discharge. Three weighted projectiles attached to the net were fired over the positioned birds. Oiled birds were quickly removed from under the net and prepared for transport. Unoiled birds were immediately released at the capture site.

#### *Net Gun*

A net gun is a firearm specifically designed to propel a net for the capture of animals. We used 30-06 crimped, blank loads to propel a 3.3 m x 3.3 m net (mesh size 5 cm – 15.25 cm), over a range of 4-20 meters. The pre-folded net is housed in a canister attached to the end of the barrel. Foam-coated weights are attached to each corner of the net to enable rapid and uniform expansion after the net gun is fired. The expanded net reaches and covers the target animals unharmed within seconds. Once the net was secured, captured oiled birds are retained for rehabilitation and unaffected birds were immediately released at the capture site.

#### *Hand Capture*

In a few instances, hand capture of oiled birds was possible where their ability to fly or otherwise evade capture was compromised by the effects of oil or other physical limitations.

#### *Delivery to Wildlife Rehabilitator*

Captured birds were individually placed in boxes for delivery to the USFWS/Tri-State, for evaluation and rehabilitation. Boxes were labeled with the species, date, location, and in the case of AC-caught birds, method of capture. For AC-caught birds, extra padding was placed around the bird to hold the head upright, and the box exterior contained a statement that the bird must not be released prior to 30 days after capture.

## RESULTS

### *Birds Captured for Rehabilitation and Release*

A total of 198 birds were captured by WS for rehabilitation. The following species were captured during the period December 12, 2004 through February 3, 2005: 190 Canada geese (124 with cannon nets, 62 with AC, 4 by hand capture), 3 mallards (2 with cannon nets, 1 with AC), 3 ring-billed gulls (2 with cannon nets, 1 by hand capture), and 2 domestic geese (with a net gun). Of the 198 birds caught by WS, 190 were released or placed (an overall success rate of 95.9%), 2 died in transit (1 Canada goose captured with the cannon net, and 1 Canada goose captured with AC), 1 Canada goose died unexpectedly 7 days after capture, and five were euthanized by Tri-State veterinarians due to pre-existing conditions or injuries (2 hand-caught Canada geese with wing fractures, 1 cannon netted Canada goose with chronic lead poisoning, 1 AC-caught Canada goose with old fractures and arthritis, and 1 hand-caught ring-billed gull in respiratory distress and moribund).

### *Effectiveness of WS Employed Methods*

Wildlife Services used AC, cannon nets, a net gun, and hand capture to collect birds. The effectiveness of capture methods depended on the condition and behavior of oiled birds, landscape features, and social/political restrictions.

#### *Alpha-chloralose*

Alpha-chloralose was well suited to collect waterfowl that readily ate handouts directly from people, in situations where 1-3 heavily oiled birds were highly visible to the public, and where traffic and other human disturbances could be eliminated or reduced during AC treatment operations. Close proximity of the Delaware River limited use of AC in some locations, since sedated birds that access large bodies of water may be difficult or impossible to capture. Alpha-chloralose use was employed near smaller bodies of water, since treated birds could easily be retrieved with nets or small boats/kayaks. Oiled birds were individually given bread baits treated with

AC. The ability to focus on individuals in mixed flocks of oiled and unoiled birds was advantageous in removing selected individuals with AC. Oiled birds could easily be captured without alarming and dispersing the remaining flock. There were 62 Canada geese and 1 mallard captured with AC from eight sites during December 2004 through January 2005. Certified AC applicators and approved personnel used both the AC powder and the tablet form. The powder form, in corn oil suspension, was more effective in sedating the oiled birds in a timely manner than the tablet form. It was speculated that the AC suspension in corn oil had better absorption through the digestive system than did AC tablets. Once AC tablets were determined to be inconsistent in their normal effectiveness, AC powder was used in a corn oil suspension with no additional issues in sedating birds. The release success rate for birds caught with AC was 96.8% (61 of the 63 AC-caught birds were successfully rehabilitated and released). For the 2 AC-caught birds that were not released, 1 Canada goose died in transit and 1 Canada goose with arthritis and old fractures was euthanized by Tri-State veterinarians.

#### *Cannon net*

The cannon net worked well in capturing large numbers of oiled birds that were more wary of human presence and that were flocked together in a relatively large open area. The cannon nets were extremely effective and were especially suited for calm days with moderate temperatures. During cold weather conditions (-5°C) and high winds (40 kmph) there was some net stiffness and incomplete net extension upon firing. Uncaptured birds on site at the time of net deployment became difficult to bait within range of the net for several days. There were not any injuries to the birds during capture, and 14 unoiled birds were purposefully freed during cannon net operations. The release success rate for oiled birds caught with cannon nets was 97.7% (125 of the 128 birds were successfully rehabilitated and released). For the 3 cannon-netted birds that were not released, 1 Canada goose died unexpectedly 7 days after capture, 1 Canada goose died in transit, and 1 Canada goose with chronic lead poisoning was euthanized by Tri-State veterinarians.

#### *Net Gun*

Ideal conditions for use of a net gun are: 1. one or two oiled birds that are mobile and moderately wary, and permit human approach in the range of 4-20 m, 2. birds that do not accept bread or other baits, 3. grassy, open capture site that allows uninterrupted net movement, and 4. discharge of firearms is allowed. Use of a net gun is not possible where firearm discharge is prohibited and where vegetation and structures would obstruct net firing. Additionally, where birds occur in large flocks and are accepting bait, use of other methods, such as AC and cannon nets were more appropriate.

During this project, the net gun was used to capture two (2) domestic geese within a small flock in a park environment that was flat and unvegetated except for a grass lawn. Firearm discharge was allowed by the municipal police department. In this situation, the net gun was the ideal capture method; two

birds were successfully captured unharmed and delivered to the wildlife rehabilitator. The success rate for the 2 domestic geese that were caught with the net gun was 100% (both birds were successfully rehabilitated and transferred to a private property in MD).

#### *Hand Capture*

Hand capture was most useful in situations where birds could easily be captured due to their inability to fly or evade capture because of physical limitations. Birds that could be hand caught were typically previously injured or weakened, and other methods were not necessary. Five birds (4 Canada geese and 1 ring-billed gull) were hand captured on five separate occasions during this project. The release success rate for birds that were hand caught was 40% (2 of the 5 hand caught birds were successfully rehabilitated and released). For the 3 hand-caught birds that were not released, 2 Canada geese with wing fractures, and 1 ring-billed gull that was in respiratory distress and moribund were euthanized by Tri-State veterinarians. The birds' compromised health and physical conditions allowed them to be hand captured, and contributed to their higher mortality rate.

The two most significant factors that limited capture of a greater number of oiled birds were: 1. inability to obtain access permission for a number of properties where larger numbers of oiled birds occurred, and 2. high human activity levels that disrupted capture on some of the sites where capture activities were authorized.

#### *Rehabilitation and Release of WS-Captured Birds*

##### *Initial Concerns Regarding the Use of AC*

The Tri-State veterinary staff had no prior experience with the use of AC, and thus had initial concerns about the use of AC to capture birds that were already stressed by oil exposure. Investigation of the available literature and conversations with researchers who had used AC to capture wild birds suggested that birds were often very excitable while going under, that birds lose their ability to thermoregulate while under AC, that birds may become hyper-responsive to certain stimuli while under AC, that birds under AC are basically "physiologically awake" but immobilized (Bennett 2002), and that overdose could easily lead to death in both the target animals as well as other animals who might accidentally ingest the bait (Zoun & Peeters 1991, Woronecki et al. 1990). Based on this information and their unfamiliarity with the drug, the Tri-State veterinary staff had the following concerns regarding the use of AC to capture the oiled birds:

- If birds become excitable while going under, and if flight became erratic if spooked during this time, affected birds might fly into objects and injure themselves, break feathers, fly into areas where they could not physically be retrieved, or fly into the water and drown.

- If the birds lost their ability to thermoregulate while under AC, they could become hypothermic in the winter field conditions or they might become hyperthermic during transportation to the rehabilitator.
- Information from the veterinary staff obtained regarding the mechanism of metabolism of AC suggested that it was inactivated in the liver (NWRC 2001). Since the liver may be compromised as a result of oil exposure (Leighton 1991, Langenberg & Dein 1983, Greth et al. 1995), potential organ compromise from the oil could have an impact on the metabolism of AC. Because AC can be used as an avicide in larger doses, birds compromised by oil may overdose on AC at lower doses, or they might take longer than the recommended 30 days to fully clear the drug from their systems.
- Because AC is a hypnotic, centrally-acting sedative, treated birds were expected to lose the ability to hold up their heads, especially during transport, possibly leading to suffocation (or aspiration if the bird regurgitated).
- The birds could become hyper-responsive while under AC (NWRC 2001); this might cause increased stress, increased cortisol release, and consequent immunosuppression. These birds were already potentially stressed and immunocompromised from the exposure to oil (Jessup and Leighton 1996), and would be additionally stressed by prolonged captivity. The possible additional stresses obtained while under AC sedation were therefore of concern.
- Birds under AC sedation should be monitored closely while coming out of sedation to avoid possible injury/trauma (breaking feathers, or hitting heads or wings) (NWRC 2001). The large caseload resulting from the spill and the late arrival of the birds at the centers could preclude close monitoring of all of the birds.
- If sedated birds did not close their eyes, corneal desiccation and subsequent corneal lesions could become a problem.
- Since these birds would not be able to receive oral fluids while under the effects of the AC, systemic dehydration might result.

Other concerns about using AC centered on the need to hold these birds for 30 days prior to release. The average time in captivity for cannon-netted birds was 17.1 days (range = 5 - 35). The extended time in captivity monopolized the use of caging that would otherwise be available for Tri-State's normal case load, required extensive additional husbandry care by the staff and volunteers, and also posed potential risks for the birds (e.g. injury from caging, foot or feather wear, and greater exposure to parasites and infectious disease due to prolonged closer contact with conspecifics than would occur in the wild).

### *Health Status and Rehabilitation*

Birds treated with AC were boxed individually and transported for rehabilitation. Upon arrival, the boxes were opened to allow for better ventilation, and placed in a heated holding room. The birds were given physical exams while still sedated (weighed, cloacal temperature taken, examined for injuries, blood sample taken, IV fluids administered, leg band applied, and feather samples). Body temperatures were generally within normal range for the AC birds examined (101-106°F); five birds had temperatures above 106°F (highest = 108.1°F) and eight birds had body temperatures below 101°F (lowest = 99.0°F). Alpha-chloralose birds that were eventually released had incoming body temperatures ranging from 99.0°F to 108.1°F. The only difference readily noted between the AC birds and the non-AC birds was that the AC birds were very hyper-responsive and jumped or twitched when touched. No oral fluids were administered to the AC birds in order to prevent accidental aspiration of fluids. The birds were then returned to the boxes, which were lined with fresh towels and placed in a quiet, heated room. The birds slowly came out of anesthesia one to 12 hours after arriving at the rehabilitation facilities; the birds "awoke" slowly and calmly, and were often observed sitting quiet but alert in their boxes.

Once awake, the birds were gavaged with Pedialyte® (Abbott Laboratories, Abbott Park, IL) and Pepto Bismol® (Proctor & Gamble, Cincinnati, OH). Each bird was given a brief examination to make sure it was fully awake and alert, prior to being washed. Once washed, the AC birds were rehabilitated according to normal protocol (Frink and Miller 1995). The AC birds were marked with blue leg bands to identify them as having received AC, and when possible were housed separately from the other birds to ensure that they would not be released prior to conclusion of the 30-day holding period.

Of the 63 birds captured using AC, one Canada goose died in transit to the wildlife rehabilitator, and one bird was euthanized (the goose was lame when captured, and determined to have arthritis in the hock joint as well as a fractured coracoid from an earlier injury not associated with capture activities).

### *Release*

Wildlife Services delivered a total of 198 birds to USFWS/Tri-State for rehabilitation. One hundred ninety of these birds (96%) were eventually released, 61 of which were AC birds. At the end of the thirty day holding period (between 5 January and 28 January 2005), each AC-caught bird was weighed, examined, banded with a USFWS permanent leg band, and loaded into a vehicle for release. The Canada geese were "free-housed" in the back of a van or SUV, and transported to Blackwater National Wildlife Refuge in Cambridge, MD, where they were allowed to exit the vehicle and disperse to the water (Chesapeake Bay). The mallard and two Canada geese that were caught with AC later (in January and February) were similarly treated and released in PA and DE, respectively.

## DISCUSSION

### Success of Alternative Capture Methods to Retrieve Flighted Birds

Wildlife Services' use of AC, cannon nets, and a net gun, to collect oiled birds that were capable of flight contributed to the success of the *Athos I* oil spill response. These alternative methods are not generally available to the public or other agencies due to costs, regulations, or logistical limitations, but were readily employed by WS in the field conditions present during the *Athos I* response. As reported in Clumpner (1997), application of proactive, non-traditional capture methods that target oiled, flighted birds early on in the response, enhances program operations. The overall success rate for release of the 198 birds captured by WS in the *Athos I* response was 95.9%. Most birds that were collected by WS were flighted, or occurred in situations where traditional capture methods were ineffective and would likely not have been captured without application of the alternative methods. The nature of the incident, where spilled oil did not remain on the surface of the river for an extended period of time, and where oiled birds did not experience large-scale initial mortality, made application of capture techniques that could target flighted birds essential. Initial concerns of veterinarians regarding use of AC included potential physiological problems associated with injury, drowning, thermoregulation, overdose, suffocation, immunosuppression, corneal desiccation, and dehydration, as well as logistical challenges associated with retention of birds for at least 30 days after treatment. Wildlife Services application of AC occurred pursuant to product labeling, WS AC use policy, and operating procedures developed in partnership among WS, State and Federal wildlife management agencies, and Tri-State, so that these concerns were eliminated or drastically reduced. Alpha-chloralose was used where birds could easily be retrieved, no AC-induced injuries were reported, doses were hand-delivered to individual birds, captured birds were carefully packed to reduce the chance of thermoregulation or suffocation problems, and other potential side effects (corneal desiccation, dehydration, etc.) either did not occur, or were treated by Tri-State veterinarians. The method's 96.8% success rate, for 63 birds that otherwise would most likely not have been captured, rehabilitated, or released, indicates the applicability of this method in oil spill responses of this nature. Alpha-chloralose caught birds housed for the thirty days did not exhibit any injuries or illness related to the longer holding period.

### Cooperative Partnerships in Wildlife Recovery and Rehabilitation in the *Athos I* Response

Cooperative partnerships, such as those developed during the *Athos I* response, permit involved organizations and agencies to focus on their specialized responsibilities and expertise. Inclusion of WS into the USFWS-lead Wildlife Recovery Group enabled capture of 198 birds that may not have been otherwise captured and rehabilitated, and developed/enhanced professional relationships that may serve

as model for future responses where field conditions warrant specialized wildlife management activities. Wildlife Services field capabilities in harassing wildlife away from oil-contaminated sites and in capturing animals affected by oil can be applied in oil spill situations that may occur in the future. Due to the cooperative partnerships and program results associated with the *Athos I* incident, WS involvement is being incorporated into the Philadelphia Area Committee's Area Contingency Plan (ACP), which may serve as a model for ACP's around the nation.

Wildlife Services' familiarity with involved agencies and their responsibilities, agreement and funding processes, its available professional workforce, and ability to work within the ICS structure will enhance WS involvement in future spill responses.

### WS Capabilities Nationwide

Wildlife Services has capabilities in every state, and has developed agreements and professional relationships with the Federal and State wildlife management agencies that are involved in spill response. Wildlife biologists and technicians with WS are trained in ICS, wildlife hazing and capture techniques, use of specialized methods such as AC and cannon nets, biological sampling, and safety procedures, and are familiar with wildlife management populations and issues in their state. Partnering with Federal and State agencies and organizations to optimize wildlife management goals and objectives is an important program value for WS.

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