

13.2.8. Rescue and Rehabilitation of Oiled Birds

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Oil contamination of waterfowl and seabirds has been documented as a significant cause of morbidity and mortality in birds for more than 50 years. Each year more than one million birds may die from oil contamination in North Atlantic waters alone; worldwide mortality is unknown.

Of special concern is that many of the seabirds commonly affected are not prolific breeders, and assessment of each species' status is handicapped by the difficulty of accurately monitoring trends in marine bird populations.

Oiled bird rehabilitation is an intensive, crisis-oriented response, requiring an experienced management agency, specialized medical expertise, stockpiles of specially designed equipment, and a tremendous investment of human resources.

Nevertheless, after a major oil spill, the public demands that the affected wildlife species be treated, and the Fish and Wildlife Service, as the mandated response agency for the United States, will be called in to respond to the situation.

Unfortunately, very few organizations have the expertise required to rehabilitate oiled birds. Public interest and involvement in the plight of oiled wildlife have resulted in some disastrous rehabilitation efforts. Oiled birds have been rolled in kitty litter, dipped in melted butter, covered with



cornmeal, and plucked, all with tragic consequences. When overseen by an experienced agency, however, successful oiled bird rehabilitation has occurred. Particular rehabilitation success is seen in swans, geese, and ducks, with average release rates exceeding 90%.

In this chapter we attempt to provide the wildlife professional with a basic understanding of the internal and external effects of oil on birds, and the key components of an effective oil spill response. We emphasize the handling of waterfowl and seabirds. This chapter does not provide the detailed information needed to manage a major oil spill response.

Effects of Oil Contamination

Once a bird is contaminated by oil, a sequence of physiologic and metabolic changes begins which contributes to its decreased chance of survival and reproductive success. Oil exposure, unless excessive, is not immediately incapacitating; most birds remain vigorous enough to avoid capture for one or more days. This delay contributes to avian mortality by complicating rehabilitation efforts and increasing the secondary exposure of eggs, nestlings, scavengers, and predators to oil.

External Effects

An immediate effect of oil exposure on birds is the disruption of their feather structure. The resulting decreases in flight ability and water repellency limit the animal's ability to forage for



Double-crested cormorant contaminated with North Sea crude oil.

food and to escape predation. Contamination and disruption of a bird's plumage also reduce the insulating properties of its feathers, increasing the bird's vulnerability to temperature extremes. In addition, a bird's direct contact with oil components can result in chemical burns and the absorption of toxic chemicals through its skin.

Internal Effects

Internal effects of oil result from the ingestion, aspiration, or absorption of oil components. Although visually less apparent than external oil effects, the internal effects of oil are equally life-threatening and often more difficult to treat. While some damage is specific to the oil fractions and contaminants involved, a general pattern of pathological changes characterizes oil toxicosis. These changes include kidney damage, altered liver function, aspiration pneumonia, and irritation of the intestines.

Birds ingest oil when they preen in an attempt to clean their feathers. The resulting intestinal irritation can exacerbate dehydration and metabolic

imbalances caused by decreased food intake. The bird can no longer absorb nutrients or regulate body fluids and electrolytes adequately, and may even hemorrhage into its intestinal tract. Anemia due to oil toxicosis has been documented. In addition, birds become less tolerant of stress and more susceptible to disease and to the effects of previously accumulated toxins.

Whereas all types of birds can be affected by a spill, some species are more vulnerable than others. Particularly susceptible are the diving birds, such as loons, cormorants, and diving ducks. Entire populations can be at risk when species that have delayed maturity and low reproductive potentials are contaminated. Birds that live in harsh environments may not survive the added stress of oil exposure and reduced food supplies.

Long-term and Secondary Effects

Oiled adults frequently contaminate nests, eggs, and young. Likewise, secondary oiling of other flock members and predators can occur.

Decreased reproductive success has been seen in birds experimentally oiled or force-fed oil. Delayed onset of laying, decreased fertility of eggs, abnormal yolk composition, and altered shell thickness have all been documented. Secondarily exposed embryos may die from suffocation or hatch with gross skeletal and bill abnormalities. Decreased growth rates and body weights of experimentally exposed juveniles may result from the ingestion of contaminated foods or the impaired parenting ability of affected adults.

In major oil spills, habitats are altered, food resources changed, and resident animals subjected to chronic oil exposure through contaminated substrates. The potential for bioaccumulation of toxic substances in invertebrates and lower vertebrates warrants further study.

Rehabilitation of Contaminated Birds

Successful oiled bird rehabilitation involves six basic procedures:

- prompt intervention and retrieval of contaminated birds;
- stabilizing the bird;
- removing oil from the bird's feathers;
- removing the cleaning agent from the feathers;

- restoring waterproofing; and
- acclimating the bird for release.

Effective rehabilitation efforts require coordination of State, Federal, and private agencies. The importance of establishing contingency plans in high-risk areas before oil spills occur cannot be overemphasized.

All field agents should be trained in handling techniques that are nonstressful to birds. A facility having adequate space, ventilation, and a regulated temperature should be identified. Hot-water sources and an approved wastewater disposal system must be located. Basic rehabilitation equipment can be stockpiled in advance, so that medical care, nutritional support, and cleaning efforts can begin without delay. Licensed rehabilitators trained in oil spill response protocols should be contacted as soon as a spill occurs.

Field Assessment, Intervention, and Retrieval

Mechanisms should be in place for all aspects of bird retrieval and management, including:

- field strategies for aerial overflights, and ground teams to identify birds at risk;
- procedures for preventing exposure of unaffected animals;
- protocols for field retrieval, emergency stabilization, and transport of contaminated birds; and
- risk assessment and safety protocols for field personnel.

Preventing Exposure

Various techniques can be used to disperse uncontaminated animals from a problem area or to concentrate and hold them in clean areas. Efforts to discourage oiled birds from contaminated areas must be done early in the spill; these can include scare devices such as propane exploders and cracker shells, hazing with motorized equipment, or relocation through baiting at an alternative feeding area. No attempt should be made to disperse oiled birds since this can lead to introduction of oiled animals into uncontaminated populations.

For priority species, unoiled animals can be relocated through capture in cannon nets, drop nets, rocket nets, and swim-in or walk-in traps, and rapidly transported to “safe” areas. The effort

and expense required to trap, examine, and relocate unoiled birds is significantly less than that required to retrieve and rehabilitate oiled animals. Appropriate hazing and trapping techniques differ in each spill situation.

Capture and Transport of Oiled Waterfowl

Human safety should be considered before any retrieval effort is made; hazardous weather conditions, unsafe footing, icy rivers, or dangerous seas may preclude a rescue attempt.

Teamwork is essential to minimize stressing these already compromised animals. As oiled birds lose their waterproofing, they move to shore, first preening on the open beaches and later hiding effectively under tussocks of grass or next to boulders. Birds in this condition should be retrievable by teams on foot; every day’s delay in retrieval significantly increases mortality.

Beached birds should be approached quietly and smoothly from the water’s edge; this technique can be extremely effective if the retrieval crews are in place shortly before dawn. If the capture attempts fail, birds should not be chased. In marine situations, boats and long-handled dip nets can be used for an approach at low tide to birds that have come ashore.

Immobilization is accomplished by placing towels, sheets, or nets over the entire bird, including the head. Heavy gloves, which reduce human dexterity and can thus cause injury to the animal, are not recommended. Birds are carefully handled through light coverings that minimize damage to the birds’ feathers and human exposure to the oil.

Netted birds are gently removed from the netting and completely covered with cloth. Care must be taken to fold the bird’s wings in a normal position against its body. A small bird can be secured against the field agent’s abdomen, at waist level; the bird is cradled in one hand with the other hand placed lightly on the back. Larger waterfowl and some species with sharp bills can be carried in a reverse body hold: the towel-covered bird is placed, facing backward, against the side of the handler’s body, under the arm. Support for the bird’s legs is provided by the hand and forearm, with the bird’s head facing backward between the handler’s upper arm and side of the body.

Aggressive birds such as raptors, cormorants, and herons can seriously injure even experienced handlers. While head restraint is important for all species, it is critical when handling these birds;

raptors should have their legs secured as well. We recommend that field personnel be trained in handling techniques for these more aggressive species.

Suspension of any bird through “wing holds” at its humerus is strongly discouraged because of the high incidence of shoulder injuries associated with this form of immobilization.

After capture, birds should be immediately placed in ventilated, solid-sided carriers—such as cardboard boxes or shipping kennels—for transport. Burlap bags and wire cages can contribute to eye injuries and feather damage, respectively, and should not be used. Social, nonaggressive birds may be placed with one or two conspecifics, but aggressive species such as loons and cormorants should be individually housed.

Crated birds should not be placed in direct sunlight or transported in open vehicles (such as pickup trucks). Birds must be evaluated frequently for overheating when the ambient temperature is greater than 70° F and for possible chilling in cooler weather. If the birds demonstrate open-mouthed breathing or other signs of heat stress, additional ventilation holes can be made and the number of birds per carrier can be decreased. Draping a portion of the container with a towel or blanket provides some protection from cold. Captured birds should receive medical evaluation and preliminary treatment within 1 to 2 hours. This can be done by trained personnel in the field or at a treatment center.

Field agents should be instructed to record all bird sightings, whether a capture effort is successful or not, so that an accurate assessment of spill impact can be made. Dead birds are retrieved and placed in plastic bags, which are then labeled with pickup location and date.

Stabilizing the Bird

Immediate treatment reduces the toxic effects of ingested oils and stabilizes the bird before cleaning. The following procedures can be done in the field; otherwise they are part of the entry treatment at a rehabilitation center.

First, oil is removed from the bird's nares and oral cavity with clean gauze or cotton swabs. Contaminants are flushed from the eyes by irrigation with a warm, sterile, 0.9% (physiologic) saline solution.

Next, a clear electrolyte solution (e.g., Pedialyte, lactated Ringer's solution) is administered by stomach tube (15–20 cc/kg) to

rehydrate the bird while flushing oil from its gut; this is followed by a small volume (2–4 cc/kg) of the enteric protectant Pepto-Bismol. Only birds that can maintain normal head carriage are given oral fluids; extremely depressed animals should receive immediate emergency treatment, including intravenous fluids for rehydration.

On admittance to the rehabilitation center, each bird is identified with a temporary leg band and given a complete physical examination; the bird's temperature and weight should also be recorded. The bird's vent is checked for possible impaction by oil or matted feathers. Feather and blood samples can be collected for diagnostic, documentation, or research purposes. Debilitated animals require more extensive medical care.

Birds that have been examined are kept warm and quiet, away from people and other stressors until judged stable enough to withstand the cleaning procedure. Once cleaned, a bird is fed a nutrient-rich tubing solution at 4–6 hour intervals until it can be given free access to food and water.

When large numbers of birds have been contaminated, it may be necessary to first treat the animals that have the best probability of survival or the greatest “value” as a species. Euthanasia may be considered for common birds that exhibit acute signs of disease or that have injuries that would require extended treatment.

Birds brought in dead, or dying at the center should be necropsied to aid in determining treatment protocols for the survivors.

Removing Oil From Feathers

Oil must be removed without damaging feather structure. A safe and effective method uses successive detergent baths in warm (103–104°F) water. Oil will not lift off the feathers in cooler water. In addition to being able to remove the oil, the cleaning agent must not irritate the skin or damage feather structure; it must be easily rinsed without leaving a residue that might interfere with waterproofing.

Extensive research indicates that Dawn dishwashing detergent (Proctor & Gamble) best meets these criteria. Many “miracle cleansers” are promoted during major oil spills; every effort should be made to avoid experimentation with these products.

Effective detergent concentrations vary from 2–15%, depending upon oil characteristics. Large quantities of detergent solution are mandatory. Ten-gallon tubs should be used to wash birds the



Cleaning a Canada goose contaminated by #6 fuel oil.

size of ducks or geese; larger birds require children's wading pools or human bathtubs.

Two handlers should restrain the bird in the tub while the detergent solution is ladled over its body and wings and the feathers gently stroked in the direction of growth. During the washing, the bird's eyes should be frequently flushed with a sterile saline solution to prevent irritation. The bird's head should be secured at all times to prevent injury to workers or its possible immersion in the detergent solution. If raptors are being cleaned, additional immobilization of the feet is necessary. Washing is successively repeated in three or more tubs, depending upon the extent and nature of the oil. Special procedures are required when tarry oils or adhesives are involved.

Removing the Cleaning Agent From Feathers

Rinsing is carried out with a combination of spray rinses and tub baths in 104°F water, until beads of water roll freely from the feathers, and the bird begins to look "dry." Special attention should be given to the undertail coverts, under the wings, and

the neck of the bird. Incomplete rinsing prevents adequate waterproofing of the feathers and is a primary cause of bird's failure to rehabilitate. Feathers should be blotted with a clean towel; the bird should then be placed to dry with free access to heat lamps.

With appropriate organization, the entire cleaning effort should take about 60 minutes; a bird that becomes stressed (rapid heart rate, open-mouthed breathing, drooping head) during cleaning should be quickly rinsed and placed in a clean, quiet area. Once stabilized, it should be washed again.

Restoring Feather Structure

Newly washed birds are placed in clean holding pens and given access to food and water.



Sterile saline is used to flush the eyes of a great blue heron to remove contaminants.

Cushioning is necessary for diving ducks and other species that are not mobile on land (e.g., loons), and appropriately sized branches should be provided for raptors and other perching birds. The birds are monitored for abnormal droppings, loss of appetite, depression, or signs of disease, and appropriate treatment is given. After 24 hours, the birds should be given access to pools of water in which they can swim and preen. Required pool size depends on the species, but the pool may need to be as large as 10 feet × 10 feet × 30 inches deep. Misting may be used to stimulate preening in those species that normally do not swim. Diving, swimming, and preening enables the bird to realign its feathers and restore feather structure. Natural oils distributed from the uropygial gland enhance feather restoration, but are not required for it. Waterproofed birds will demonstrate diamondlike beading of water on their feathers and will be able to remain in water (the time varies with species) or be misted without getting wet.

For properly washed birds not suffering from complicating factors, the entire cleaning and restoration process can occur in 48–96 hours.

Acclimating and Evaluation for Release

Waterproofed birds are gradually exposed to outside weather conditions. Seabirds are preconditioned by being fed successive tubing solutions of 2.0% saline for 24–48 hours before release to stimulate and evaluate salt gland function.

Candidates for release must be waterproof, active and alert, of average weight for species and sex, have adequate musculature, and exhibit no discernible signs of disease.

Birds should be banded with U.S. Fish and Wildlife Service bands (State and Federal banding permits required) and released early in the day in an appropriate, oil-free habitat.

Management of Major Oil Spill Crises

Rehabilitating a single oiled bird is difficult; an oil spill involving 50, 100, or 1,000 contaminated animals introduces crisis-management concerns, including media relations, volunteer and staff training, human health hazards and liability, interagency communication and coordination, disposal of environmental wastewater, and stress management.

Delineation of Responsibility

Federal field response coordinators should focus on supervision of the overall response, including the private and State agencies and cleanup contractors responsible for retrieval, rehabilitation, and release of wildlife. All costs should be documented and recovered from the spiller or from specially designated Federal accounts.

To ensure a safe, efficient response, no agency or organization should be contracted to rehabilitate oiled birds unless it possesses proper Federal permits, has adequate liability insurance for staff and volunteer workers, and is experienced in wildlife oil spill responses. The organization should be able to obtain independent analysis of the oil and assessment of potential hazards to human workers. All treatment protocols should be clearly presented, and, if necessary, justified for the designated Service field response coordinator.

Worker safety and agency liability are areas of growing concern. Occupational Safety and Health Administration (OSHA) standards concerning hazardous wastes and emergency responses also apply to some aspects of oil spill responses. Application of these rulings is not uniform; we recommend that regional OSHA offices be contacted for current information. Disposal of wastewater from a cleaning center must be in compliance with State and Federal regulations; current techniques include reclaiming oil fractions and treating wastewater or disposing of it in an approved landfill. Disposal contracts should be made with reputable and licensed haulers. County health departments, local hospitals, and area veterinarians can offer assistance for proper disposal of medical wastes. Nonperishable supplies can be stockpiled for use in future spills.

Controlled Access and Public Relations

Access to the rehabilitation center must be strictly controlled. Only trained volunteers and those directly participating in the response should be admitted. All workers should wear name tags identifying their assigned responsibilities.

Members of the general public attempting to visit the center should be thanked for their concern and given a brochure describing the center's procedures and offering them an opportunity to sign up for future training sessions or to donate needed materials (sheeting, towels, pie plates, etc.).

Center policies should be established and posted to aid in effective and accurate media

communication. Comments to the media should be restricted to those taken directly from the daily news release, which should be typed every morning and be available to the press.

Interviews and video opportunities should be limited to one or two 15-minute sessions daily, with the times clearly posted at the entrance to the center.

Rehabilitation Center Operations

During the first days of an oil spill response, the center is open almost 24 hours a day, with staff and volunteers working rotating shifts. Certain policies are followed to provide continuity and consistency of operation.

Each area of the facility should be clearly identified and posters describing the treatment protocol for that area should be prominently displayed. An end-of-day report summarizing all pertinent operational and caseload information should be completed each day by the appropriate staff.

At least one person should be on duty during each shift to handle all telephone calls; a second worker should be responsible for weekly scheduling of staff and volunteers. A supplies team should obtain all items necessary for smooth operation of the center.

Even in a small oil spill response, resource needs are tremendous. If the rehabilitation center admitted and treated 30 birds a day, three wash lines would be needed, necessitating 10 bird-cleaning volunteers for each 8-hour shift. As much as 4,500 gallons of clean water would be required, half of which would become oil-contaminated, requiring special disposal. Workers would also be needed for each shift for operations control, medical, and rehabilitation areas, swelling the number of people needed for one 24-hour day to 54.

Conclusion

Bird rehabilitation after a major oil spill is an emergency operation requiring immediate action by prepared, experienced personnel. The key components of an effective response are:

- contingency planning to identify key agencies, people, and material needs;
- rapid response;
- enlisting an experienced response agency to direct wildlife care; and
- adherence to proven protocols.

Suggested Resources

- Bayer, R. D. Oiled birds: How to search for and capture oiled birds at Oregon intertidal areas. Gahmken Press, Newport, Ore. 30 pp.
- Burridge, J., and M. Kane, editors. 1985. Rehabilitating oiled seabirds: a field manual. American Petroleum Institute, Publication 4407. Washington, D.C. 79 pp.
- Environment Canada. How to rescue oiled birds. (For information on this 20-minute video, contact Environment Canada, 351 St. Joseph Boulevard, Ottawa, K1A 0H3.)
- Friend, M. 1987. Field guide to wildlife diseases. Vol 1: General field procedures and diseases of migratory birds. U.S. Fish Wildl. Serv., Resour. Publ. 167. 225 pp.
- Frink, L. F., and S. Welte. 1990. Oiled bird rehabilitation: a guide for establishing and operating a treatment facility for oiled birds. Unpublished manual. Tri-State Bird Rescue and Research, Inc., Wilmington, Del. 65 pp.
- Leighton, F. 1983. The pathophysiology of petroleum oil toxicity in birds: a review. *In* D. G. Rosie and S. N. Barnes, eds. The effects of oil on birds: physiological research, clinical applications and rehabilitation. Proceedings of a 17–19 September 1982 conference at the Wetlands Institute, Stone Harbor, N.J.

Experienced Response Agencies

- International Bird Rescue Research Center, 699 Potter Street, Berkeley, Calif. 94710. (415)841-9086.
- Tri-State Bird Rescue and Research, Inc., P.O. Box 289, Wilmington, Del. 19899. (302)737-7241.

Environment Canada has trained response agencies in Newfoundland, Nova Scotia, and Quebec. Contact: Gilles Lauzon, Contingency Planning Officer, Environmental Emergencies, Environment Canada, PVM, 15th Floor, 351 St. Joseph Blvd., Ottawa, Canada, K1A 0H3.

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