

ENDANGERED SPECIES AND MIGRATORY BIRD TREATY ACT CONSIDERATIONS IN RODENTICIDE REGISTRATION AND USE

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Abstract: The Endangered Species Act and the Migratory Bird Treaty Act protect wildlife from injury or harm resulting from human activities, including pesticide use. In administering these laws, the U.S. Fish and Wildlife Service (USFWS) advises federal and state agencies, and private landowners and organizations of ways in which to minimize the adverse effects of rodenticides upon threatened and endangered species, and migratory birds. Technical assistance and formal consultation with USFWS can occur on both the registration and use of a rodenticide, and may result in general mitigation to the overall labeled use of a product, or site-specific modification based on the presence of a sensitive species or habitat. To date, the U.S. Environmental Protection Agency, which is the federal agency responsible for registering pesticides, has consulted with the USFWS on rodenticide registrations limited to local areas (e.g., Special Local Needs registrations). However a comprehensive assessment of potential effects to threatened and endangered species and sensitive populations of migratory birds has not been completed to date for any currently registered rodenticide. Thus, reliance solely on labeled use restrictions may not adequately protect vulnerable species of wildlife. Rodenticides have been associated with mortality incidents involving the endangered San Joaquin kit fox, the previously endangered bald eagle and peregrine falcon, and numerous species of migratory birds.

Key words: birds, Endangered Species Act, Migratory Bird Treaty Act, non-target organisms, pesticides, rodent, rodenticides

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INTRODUCTION

Rodenticides, like all pesticides, are registered by the U.S. Environmental Protection Agency (USEPA) under the authority of the Federal Insecticide Fungicide and Rodenticide Act (FIFRA). In registering pesticides, USEPA is required by FIFRA to ensure that "when used in accordance with widespread and commonly recognized practice it will not generally cause unreasonable adverse effects on the environment." Adverse effects are defined under FIFRA as "any unreasonable risk to man or the environment, taking into account the economic, social, or environmental costs

and benefits of the use of any pesticide". This definition affords USEPA a large amount of discretion in determining what adverse effects are deemed "unreasonable" and mandates that in the evaluation of such adverse effects, the agency must consider and balance these environmental costs against economic benefits associated with the pesticide's registration and use.

The Migratory Bird Treaty Act (MBTA) and the Endangered Species Act (ESA) protect wildlife from injury or harm resulting from human activities, including pesticide use. In administering these laws, the U.S. Fish and Wildlife Service

(USFWS), and in the case of the ESA the National Oceanic and Atmospheric Administration Fisheries program (NOAA-Fisheries), advise federal and state agencies, and private landowners and organizations of ways in which to minimize the adverse effects of rodenticides upon migratory birds and species listed as threatened or endangered under the ESA (listed species). Each of these laws specifically defines adverse effects that constitute "take" of species and preclude the weighing of costs and benefits when assessing such effects. The MBTA defines take as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to hunt, shoot, wound, kill, trap, capture, or collect." The ESA defines take as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Thus, adverse effects to species, as defined by the MBTA and the ESA, amount to take regardless of the societal or economic benefits. Without consideration of these laws at the time of pesticide registration, FIFRA's cost-benefit treatment of adverse environmental impacts can result in use authorizations that are in direct conflict with conservation laws.

Under section 4 of FIFRA, USEPA is reviewing nine currently registered rodenticides (brodifacoum, bromadiolone, bromethalin, chlorophacinone, cholecalciferol, defethiolone, diphacinone, warfarin, and zinc phosphide) for their effects to human health and the environment for the purpose of reregistration (USEPA 2004). Due to their wide use, non-specific mode of action, and tendency to accumulate in animals, several rodenticides pose risks to non-target vertebrates that are either directly exposed to bait or consume treated target animals. While sublethal effects are difficult to detect, mortality incidents involving species protected by the MBTA and ESA have been well-documented and

continuous (USEPA 2004, 2006). Though species are managed at the population level under the MBTA and ESA, regulation and enforcement often occurs at the level of the individual. Thus, the take of a single individual of a protected species as the result of rodenticide exposure can amount to a violation of either of these acts.

MIGRATORY BIRD TREATY ACT

The MBTA was originally enacted in 1918, and amended in subsequent years to ratify conventions with Canada, Japan, the former Soviet Union, and Mexico for the protection of migratory bird resources shared by the United States and each of these countries. While initially instituted to halt the commercial trade in birds and feathers responsible for species decline, the MBTA today includes broad language making it unlawful "by any means or in any manner, to pursue, hunt, take, capture, kill.... any migratory bird, any part, nest, or eggs of any such bird...included in the terms of the conventions." The MBTA covers any avian species with evidence of natural occurrence in the United States or its territories, and for which the family or species is listed in one of the treaties. The USFWS currently recognizes 832 species of migratory birds (50 CFR 10.13). The U.S. Department of the Interior is given the authority under this act to manage selected species of game birds for hunting, and to issue permits for specific activities such as scientific collection, education, falconry, and depredation. However, unlike the ESA, as discussed below, there is no expressed provision within the MBTA for the issuance of permits for take of an individual that occurs incidental to another activity ("incidental take"). With the exception of recent regulations authorizing the Armed Forces to take migratory birds incidental to military activities (72 FR 8931), the USFWS has not

promulgated regulations addressing incidental take.

While the MBTA does not explicitly designate "poisoning" in its definition of take, case law has established that avian mortality resulting from exposure to pesticides is a violation of the MBTA. In the 1970s, significant cases involving birds exposed to the pesticide carbofuran, including the deaths of birds following application to an alfalfa field (*U.S. v. Corbin Farm Services*, 444 F. Supp. 510 [1978]) and release in a manufacturing plant wastewater pond (*U.S. v. FMC Corp.*, 572 F. 2d 902 [1978]) established that the MBTA applied to poisoning of birds by pesticides registered under FIFRA. In a broader context, these decisions also helped to establish that the MBTA applied to the unintentional killing of birds.

Birds protected under the MBTA are susceptible to rodenticide poisoning as a result of both direct ingestion of pesticide and secondary exposure from consumption of treated target animals. Table 1 illustrates mortality events for migratory birds reported through November 2006 in USEPA's Ecological Incident Information System for which rodenticides have been detected in the carcass (USEPA 2004, 2006). These incident reports are likely to represent only a fraction of the actual mortality for any given pesticide (Vyas 1999). In order to document a pesticide-related mortality, a carcass must be observed, reported, collected, and chemically analyzed while still relatively fresh. Carcass-detection studies have found

that even when searches are performed on known carcasses, a significant percentage will never be found due to scavenging, location in remote, inaccessible areas, or size or coloration that renders the carcass inconspicuous (Vyas 1999). However, incident reporting can be a useful mechanism by which to draw attention to the unintended consequences of pesticide use, distinguish the magnitude of the problem as compared to other pesticides, and elucidate the probable exposure routes causing the effect. Mortality events in Table 1 are classified within three categories of rodenticides currently under review by USEPA: second-generation anticoagulants (brodifacoum, bromadiolone, difethiolone), first-generation anticoagulants (chlorophacinone, diphacinone, warfarin) and non-anticoagulant rodenticides (bromethalin, cholecalciferol, zinc phosphide). While individual pesticides vary in their relative contribution to each category, the general groupings illustrate the tendency for anticoagulant rodenticides, particularly second-generation formulations, to accumulate in predators and scavengers that ingest treated prey or carcasses, and for non-anticoagulants, specifically zinc phosphide, to affect primary consumers that ingest bait directly. To minimize exposure and reduce take of migratory birds, the USFWS has recommended that USEPA enact tighter restrictions on these pesticides, including limiting their use to certified applicators and within tamper-resistant bait stations.

Table 1. Migratory bird mortalities reported through November 2006 in the USEPA's Ecological Incident Information System for which rodenticides have been detected in the carcass.

Rodenticide	owls	raptors	eagles	scavengers	waterfowl	turkeys
Second generation anticoagulants ¹	103	120	15	22	1	0
First generation anticoagulants ²	4	6	1	1	0	5
Non-anticoagulant rodenticides ³	0	0	0	0	483	32

¹Brodifacoum, bromadiolone (no data for difethialone)

²Chlorophacinone, diphacinone, warfarin

³All results for zinc phosphide (no data for cholecalciferol, bromethalin); 455 waterfowl were reported from a single incident.

Under Executive Order 13186, all federal agencies have a responsibility to take steps to conserve migratory birds and reduce take of these species (66 FR 3853). Experts on migratory birds and wildlife toxicology in the USFWS can provide technical assistance to USEPA during the registration process to establish use parameters based on species' range, migratory patterns, feeding habits, and other biological characteristics that can minimize exposure of migratory birds to pesticides. However, since this interaction does not take place for every pesticide registration, and USEPA can ultimately register pesticides under the cost-benefit parameters of FIFRA, many current rodenticide labels are not adequately protective of migratory birds. While the USFWS continues to work with USEPA to achieve compliance for laws regulating migratory bird conservation, rodenticide applicators, including other federal agencies, certified applicators, and individuals, should work with the USFWS as well as their local and state wildlife agencies to ensure that their particular use of a rodenticide does not pose risk to migratory birds.

ENDANGERED SPECIES ACT

The ESA was enacted in 1973 to conserve endangered and threatened species and the ecosystems upon which they

depend. The USFWS and NOAA-Fisheries administer the ESA jointly, with the majority of species (approximately 1,250 of 1310 currently listed species) managed by the USFWS. The ESA differs from the MBTA in that it protects habitats as well as species, including specific geographic areas with physical and biological features essential to the conservation of a listed species known as "critical habitat".

Section 7 of the ESA contains provisions that mandate the responsibility of listed species protection to all federal agencies, not just those actively engaged in conservation activities. Specifically, section 7 requires federal agencies both to conduct programs to conserve listed species, and to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of those species. If an agency determines that an action may affect a listed species, they are required to consult with either the USFWS or NOAA-Fisheries, as appropriate, on the effects of that action. While these provisions are exclusive to federal agencies, private individuals must also obtain the appropriate authorization to conduct activities that will result in the take of listed species. If a federal agency is involved (e.g., they are funding or authorizing an activity such as a pesticide registration), this authorization can be

obtained through section 7 of the ESA. All registration activities under FIFRA are subject to section 7, including registrations of new pesticide products or new uses of registered products, reregistration or registration review of older pesticides, emergency exemption requests and crises, and special local needs registrations.

There are two processes in which federal agencies can engage in section 7 consultation with the USFWS and NOAA-Fisheries: informal consultation and formal consultation. Informal consultation is an optional process of technical assistance to evaluate potential effects of an action on listed species and habitat, and in which the USFWS and NOAA-Fisheries can recommend modifications necessary to avoid adverse effects. This type of consultation often occurs when USEPA biologists are evaluating emergency exemption requests or special local needs permits in areas where listed species may be present. This process may result in modifications to labels such as timing of pesticide applications or restrictions in specific geographic areas to eliminate potential adverse effects to listed species.

Formal consultation is a mandatory process between the USFWS and another federal agency for proposed actions that are likely to adversely affect listed species. This type of consultation concludes with the issuance of a document known as a "biological opinion" that evaluates the proposed action in relation to the baseline status of the species and assesses the additive effect of that action with other stressors to which the species is exposed. For actions where take of a listed species may occur, the USFWS can issue an incidental take statement estimating the amount of take that may occur as a result of the action, and include "reasonable and prudent measures" to minimize the extent or impacts of that take. Such reasonable and

prudent measures, along with the associated "terms and conditions" that implement them, are mandatory and must be followed for the take to be exempt from the prohibitions against take identified in section 9 of the ESA. If an action is found to jeopardize the continued existence of a listed species, the USFWS or NOAA-Fisheries will recommend "reasonable and prudent alternatives" to avoid that jeopardy.

Rodenticides have been associated with mortality incidents involving the endangered San Joaquin kit fox, and the previously listed bald eagle (*Vulpes macrotis*) and peregrine falcon (*Haliaeetus albaiilla*) (USEPA 2004). The last formal consultation with USEPA to assess the effects of rodenticide registration activities on all listed species was completed in 1993 and included 8 of the 9 rodenticides currently being reviewed by USEPA (excluding difethiolone) (USFWS 1993). The biological opinion issued by the USFWS identified between 14 and 35 species for each rodenticide to which adverse effects were likely to occur (Table 2), for a total of 55 different potentially affected species, or 30% of all the terrestrial vertebrates listed at the time. Individual rodenticides were found to potentially jeopardize the continued existence of 7 to 30 species per pesticide, barring the implementation of reasonable and prudent alternatives suggested in the opinion. While the USFWS has consulted with other federal agencies on their use of rodenticides since 1993, no correspondence has been received from USEPA to indicate that any of the reasonable and prudent measures to minimize the impact of take required by the biological opinion, nor the reasonable and prudent alternatives to avoid jeopardy, have been instituted. Therefore, general use of these pesticides cannot be assumed to be protective of listed species covered in that opinion, nor species listed since that time. A

total of 238 additional animals have been listed since that biological opinion was

completed, 67 of which are terrestrial vertebrates.

Table 2. Number of listed species evaluated in the U.S. Fish and Wildlife Service 1993 biological opinion "Effects of 16 Vertebrate Control Agents on Threatened and Endangered Species" determined likely to be adversely affected by rodenticides currently under review by the U.S. Environmental Protection Agency.

	# of species likely to adversely affected, but not jeopardized ¹	# of species likely to be jeopardized	TOTAL
Brodifacoum	8	12	20
Bromadiolone	5	7	12
Bromethalin	4	10	14
Chlorophacinone	7	21	28
Diphacinone	4	30	34
Warfarin	4	10	14
Cholecalciferol	4	10	14
Zinc Phosphide	6	29	35
Difethialone	N/A ²	N/A	N/A

¹ Jeopardy is defined as when an action is reasonably expected, directly or indirectly, to diminish a species' numbers, reproduction, or distribution so that the likelihood of survival and recovery in the wild is appreciably reduced ²N/A = not assessed

At present, USEPA has committed to perform a comprehensive section 7 analysis for all rodenticide registrations currently under review for reregistration. With over 1300 listed species, nine rodenticides, and few geographic limitations on rodenticide use, this process will take considerable time until completion. Any resulting use limitations resulting from this process will manifest as a generic endangered species label statement requiring users to access a USEPA-hosted website to check for county-specific restrictions. In the meantime, federal agencies should continue consulting with the USFWS on their use of rodenticides. Additionally, private individuals and organizations with concerns regarding rodenticide use and listed species

should contact their local USFWS field office for assistance.

CONCLUSION

Rodenticide registration and use is subject to compliance with the MBTA and the ESA. These wildlife statutes contain standards of protection for migratory birds and listed species that differ from those designated under FIFRA, including the protection of individuals within a species. At present, mortality events involving protected species demonstrate the inadequacy of current labeled restrictions in conserving vulnerable wildlife and the need to develop more protective use parameters to achieve compliance with MBTA and ESA. USEPA is in the process of reviewing all of

its currently registered pesticides for reregistration under FIFRA, including risks to protected species. General restrictions, such as limiting use of second-generation anticoagulants to certified applicators, will minimize effects to protected species, and help to meet the standards of protection that are granted under the MBTA and ESA.

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