

Appendix D – Wildlife Mortality Incidents

Table D1. Wildlife Mortality Incidents Attributed to Use of Brodifacoum

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
B0000-501-40	1998	Undetermined	Highly probable	NY	Field	Owl (1)	A Great Horned Owl was found dead in a field area and collected for examination. The stomach contained a large pellet of muskrat hair and bone. An analysis of the liver detected brodifacoum residues of 0.30 ppm.
I002991-001	1995	Undetermined	Highly probable	GA	Field	Owl (2)	Two owls were dead on consecutive days residing near a poultry house. One bird had a small focus of hemorrhage on the lateral aspect of the pectoral muscle. There was extensive hemorrhage into the lungs and surrounding anterior airsacs. The second bird had extensive hemorrhage surrounding the liver. Analyses of the liver detected brodifacoum residues of 0.85 pm in one bird and 0.75 ppm in the second.
I003080-001	1994	N/R	Highly probable	NY	Residential	Owl (1)	A Great Horned Owl was found dead in a residential area with an injury noted to its right wing and side. Intense subcutaneous hemorrhage was present over all aspects f the wing from the mid-humerus to almost the wrist. There was a trace of watery blood in the heart and large vessels. An analysis of the liver was detected brodifacoum residues of 0.41 ppm. No other anticoagulants detected
I003082-001	1994	Undetermined	Highly probable	NY	Residential	Owl (1)	A Great Horned Owl was found dead in a residential area. There was extensive hemorrhage found between the abdominal wall and the stomach and had the appearance of having occurred over a period of time. The stomach was packed with vole remains. An analysis of the liver detected brodifacoum residues of 0.53 ppm.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I003089-001	1994	Undetermined	Highly probable	NY	Residential	Hawk (1)	A red-tailed hawk was found dead in a residential area and delivered to a wildlife pathology unit. A small amount of blood was present in the heart or large vessels. The stomach contained a grey squirrel mandible. An analysis of the liver detected brodifacoum residues of 0.46 ppm. No other anticoagulants detected
I003091-001	1994	Undetermined	Highly probable	NY	Field	Owl (1)	A Great Horned Owl was first observed in a field hedgerow and reportedly flew into the woods, landed on the ground and died 2-3 hours later. A slight subcutaneous edema was noticeable over the breast and abdomen. An analysis of the liver detected brodifacoum residues of 0.73 ppm. The brain contained 3.1 ppm of the DDT metabolite DDE. It was determined the cause of death was due to brodifacoum poisoning. No other anticoagulants detected
I003092-001	1994	Undetermined	Highly probable	NY	Field	Owl (1)	A Great Horned Owl was found dead near a pond on a farm. The use of brodifacoum (product name HAVOC) was reported around the barns where a rat problem existed. The owl had subcutaneous hemorrhage present over much of the left foot. Almost no blood was found in the heart or major vessels. An analysis of the liver detected brodifacoum residues of 0.64 ppm. No other anticoagulants detected
I003093-001	1994	Undetermined	Highly probable	NY	Residential	Hawk (1)	A red-tailed hawk was found in a residential area. Extensive subcutaneous hemorrhage was present over the breast, near the right shoulder, and between the knee and hock on the right leg. The stomach contained the remains of four shrews. An analysis of the liver detected brodifacoum residues of 0.23 ppm. No other anticoagulants detected.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I003094-001	1995	Undetermined	Highly probable	NY	Residential	Hawk (1)	A red-tailed hawk was found in a debilitated condition at a residential address and died in the care of Volunteers for Wildlife the next day. An analysis of the liver detected brodifacoum residues of 0.76 ppm. No other anticoagulants detected.
I003211-001	1995	Registered use	Highly probable	NY	Residential	Hawk (1)	A red-tailed hawk was found dead on the grounds of a museum and initially submitted to Volunteers for Wildlife. Marked subcutaneous hemorrhage was found at the right elbow. Lesser hemorrhage was found above the right hock and along the lower right side of the abdomen. An analysis of the liver detected brodifacoum residues of 1.6 ppm. No other anticoagulants detected.
I003349-001	1995	Undetermined	Highly probable	NY	Urban	Hawk (1)	A red-tailed hawk was found dead and submitted for necropsy. Intense hemorrhage was present in the abdomen, principally within the ventral abdominal fat deposits. An analysis of the liver detected brodifacoum residues of 0.43 ppm. No other anticoagulants detected
I003391-001	1996	Undetermined	Highly probable	NY	Residential	Fox (2), Raccoon (1)	Two foxes and one raccoon were found dead under a deck of a residential address. One fox showed hemorrhagic edema over the top right side of the head and lungs. The lungs of the second fox also had hemorrhagic areas. Stomach contents of the foxes had some ingested material of uncertain origin and a few deer hairs. The raccoon had some edema noted on the head and snout, a bruise over the scapulae in the back, and intermuscular hemorrhage present on the right side of the thorax. Irregular blue-green granules were found in the stomach of the raccoon. Analyses of the livers detected brodifacoum residues of .32 and 4.01 in the foxes, and 1.0 ppm in the raccoon. No other anticoagulants detected

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I003400-001	1996	Undetermined	Probable	NY	Field	Raven (1)	A raven was found dead in a field area. Hemorrhage was present on the medial aspect of both knees, in the neck muscle, on the skull cap, and on the left side of the cerebrum. An analysis of the liver detected brodifacoum residues of 1.4 ppm. No other anticoagulants detected.
I003597-002	1996	N/R	Highly probable	NY	Field	Owl (1)	A Great Horned Owl was found dead in a State Forest area. Severe hemorrhage was present in the fat located between the stomach and abdominal wall. Slight subcutaneous hemorrhage was found around the right hock and also in the lumen of the intestine at two sites. Brodifacoum residues were identified in the liver but the numerical amounts were not provided in this incident report.
I003908-017	1994	Misuse (accidental)	Highly probable	NY	N/R	Hawk (1)	A red-tailed hawk had been kept in a cage for rehabilitation and died when an attendant fed to it a dead rat which had been killed from brodifacoum poisoning. No confirmatory residues analysis was provided with the report.
I003908-023	1994	N/R	Highly probable	NY	Residential	Owl (1)	A Great Horned Owl was found dead at a residential address. Extensive subcutaneous hemorrhage was present along the lower right leg from the knee to the toes, especially around the hock, tarsometatarsus, and the lateral aspect of the tibia. Minor hemorrhages were present over the right breast, within the left pectoral muscle, at the lateral margin of the right-eye, and along the lateral aspect of the lower left leg. The alimentary canal had a trace of small mammal fur and bone and some dark viscous fluid in the caecae. An analysis of the liver detected brodifacoum residues at 0.1 ppm. No other anticoagulants detected.
I003908-024	1994	Undetermined	Highly probable	NY	N/R	Hawk (1)	A red-tailed hawk was found dead and a liver analysis detected 1.6 ppm brodifacoum residues. The New York Department of Environmental Conservation judged brodifacoum to be the cause of death.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I003909-009	1995	N/R	Probable	NY	N/R	Owl (1)	A Great Horned Owl died of poisoning by brodifacoum and bromodiolone but no quantitative information was provided in the report.
I003909-012	1996	Undetermined	Probable	NY	N/R	Hawk (1)	A red-tailed hawk was determined to have died as a result of consuming a rodent that had been poisoned by brodifacoum. There was no confirmatory residue analysis that was part of the report.
I004151-001	1996	Undetermined	Highly probable	NY	Field	Hawk (1)	A red-tailed hawk was found dead by a hiker. A 0.177 caliber pellet gun projectile was discovered in a dried accumulation of blood at the base of the three secondary feathers near the left wrist. Minor subcutaneous hemorrhage was present on the left side of the abdomen at the left knee and lateral to the posterior pelvis on the left side. A firm ball of small mammal fur was present in the stomach. An analysis of the liver detected brodifacoum at 0.65 ppm.
I004152-001	1996	Undetermined	Highly probable	NY	Residential	Owl (1)	A Great Horned Owl was found debilitated at a residential address and died later that evening. The lower right leg showed a hemorrhagic edema. The remains of a vole were present in the stomach. An analysis of the liver detected brodifacoum residues of 0.35 ppm. No other anticoagulants detected.
I004169-073	1992	N/R	Probable	VA	Field	Goose (1)	Two muscovies and three domestic geese were brought to a livestock market. One of the geese was observed flapping its wings just prior to falling dead. The National Wildlife Health Research Center determined brodifacoum was responsible for the bird's death. There was no confirmatory residue analysis provided in the incident report.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I004169-083	1993	N/R	Highly probable	VA	Residential	Squirrel (1)	A man found four dead squirrels on his property and had one frozen for analysis. The Animal Health Diagnostic Laboratory at Michigan State University detected brodifacoum at a significant concentration although the exact concentration was not provided in the incident report.
I004666-001	1996	N/R	Highly probable	NY	Golf Course	Hawk (1)	A red-tailed hawk was found at a golf course and subsequently passed a large blood clot and died. It was submitted to a wildlife pathology unit for postmortem examination. Pieces of a white mouse were found in the upper alimentary canal. An analysis of the liver detected brodifacoum residues of 0.5 ppm. No other anticoagulants detected.
I004770-001	1996	N/R	Highly probable	NY	Residential	Squirrel (1)	A grey squirrel was found debilitated at a residential address and submitted to a wildlife pathology unit where it died overnight. Subcutaneous and/or intramuscular hemorrhage was present in the right hind leg, at the left elbow, and the dorsal and right lateral aspects of the neck. The heart contained very pale, watery blood. A analysis of the liver detected brodifacoum residues although the exact concentrations were not provided in the incident report.
I004771-001	1997	N/R	Highly probable	NY	Residential	Crow (1)	A crow was found in a debilitated state at a residential address and died less than an hour later. Sever hemorrhage was present within the right pectoral muscle and around the right shoulder. The gizzard contained a blue-green granular material appearing to be anticoagulant pesticide bait. An analysis of the liver detected brodifacoum residues although the exact concentrations were not provided in the incident report.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I004938-001	1996	N/R	Highly probable	NY	Field	Eagle (1)	A Golden Eagle was found dead in a State Park area. The remains were later submitted to a wildlife pathology unit. The lungs appeared to be very congested and showed areas of hemorrhage. The stomach contained a small mass of hair resembling that from an opossum or raccoon. An analysis of the liver detected brodifacoum residues at 0.03 ppm.
I004938-003	1997	N/R	Highly probable	NY	Field	Owl (1)	A Great Horned Owl was found dead in a wooded area. Extensive subcutaneous hemorrhage was present all over the belly, posterior and right lateral aspects of the breast, right shoulder, and proximal right wing. The stomach contained one molar tooth from a grey squirrel and traces of hair and bone fragments. An analysis of the liver detected brodifacoum residues at 0.08 ppm. No other anticoagulants detected.
I004993-017	1996	Undetermined	Highly probable	CA	N/R	Eagle (1)	The California Fish and Game listed brodifacoum as the highly probable cause for the death of this eagle. There was biological or biochemical evidence only with no ancillary information. Chemical residue analysis was not included with this report.
I005213-001	1997	Undetermined	Highly probable	NY	Residential	Raccoon (1)	A raccoon was found dead in the attic of a residential address. This raccoon was reportedly seen to be alive two days earlier. Subcutaneous and intramuscular hemorrhage was found on the left side of the thorax and in both hindlegs. The chambers of the heart were nearly devoid of blood. An analysis of the liver detected brodifacoum residues of 0.32 ppm. No other anticoagulants detected.
I006007-001	1997	N/R	Highly probable	NY	Field	Owl (1)	A Great Horned Owl was found standing in a small stream and taken to a rehabilitation center where it died later that day. A large hemorrhage was present in the musculature of the right thigh. The stomach contained small rodent hairs and bones. An analysis of the liver detected brodifacoum residues of 0.22 ppm. No other anticoagulants detected.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I006306-015	1989	Undetermined	Highly probable	NY	Residential	Owl (1)	A Great Horned Owl was found dead at a residential address and had been observed to be alive in a tree a few hours earlier. Subcutaneous hemorrhage was present over the abdomen and near the left shoulder. The lungs were congested with watery blood-tinged fluid. A analysis of the liver detected brodifacoum residues at 0.2 ppm. No other anticoagulants detected.
I006924-001	1997	N/R	Highly probable	NY	Residential	Owl (1)	A Great Horned Owl was found dead in the backyard of a residential address and arrived at a wildlife pathology unit for examination. The owl had extensive intra and intramuscular hemorrhage present. A analysis of the liver detected brodifacoum residues at 0.09 ppm. The DDT metabolite DDE was detected at 39.6 ppm, though the cause of death was determined to be from brodifacoum. No other anticoagulants detected.
I006968-001	1998	N/R	Highly probable	NY	Urban	Skunk (1), Fox (1)	A skunk and grey fox were found dead adjacent to a Toxic Waste Site. The skunk and fox were submitted to a wildlife pathology unit later that day. In the skunk, areas of hemorrhage were present in the lungs and in the small intestine. The stomach contained small mammal fur and small bird feather. In the fox, the lungs were hemorrhagic and bloody fluid was present in the thorax. Hemorrhage was also present in the musculature on the left side of the rib cage. The stomach contained a piece of small mammal skin with attached hair. An analysis of the liver detected brodifacoum residues of 0.3 ppm in the skunk and 0.02 in the fox. No other anticoagulants detected.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I007107-004	1997	Undetermined	Highly probable	CA	N/R	Eagle (1)	This incident is one of the incidents reported in a consolidated incident report for the year 1997 by the Pesticide Investigation Unit of the California Department of Fish and Game. One golden eagle was reported dead by brodifacoum poisoning and no other details were reported.
I007107-011	1997	Undetermined	Highly probable	CA	N/R	Coyote (1)	This incident is one of the incidents reported in a consolidated incident report for the year 1997 by the Pesticide Investigation Unit of the California Department of Fish and Game. One coyote was reported dead by brodifacoum poisoning and no other details were reported.
I007107-013	1997	Undetermined	Possible	CA	N/R	Coyote (1)	This incident is one of the incidents reported in a consolidated incident report for the year 1997 by the Pesticide Investigation Unit of the California Department of Fish and Game. One coyote was reported dead by brodifacoum poisoning and no other details were reported.
I007165-001	1997	Registered use	Highly probable	CA	Field	Coyote (1)	A coyote was found next to a creek and had been fitted with a radio collar incorporating mortality indicators for quick retrieval upon death. Free blood was present in the thoracic and abdominal cavities. An analysis of the liver detected brodifacoum residues of 0.054 ppm.
I007165-002	1997	Undetermined	Highly probable	CA	Field	Coyote (1)	A radio collared coyote with mortality indicators for quick retrieval was found dead in a streambed. Free blood was present in the thoracic and abdominal cavities. The lungs were congested and oozed blood when cut. An analysis of the liver detected trace residues of brodifacoum although the exact concentrations were not provided in this incident report.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I007165-003	1997	Undetermined	Highly probable	CA	Field	Coyote (1)	A radio collared coyote with mortality indicators for quick retrieval was found dead in thick riparian vegetation. The animal's home range covered both urban and parkland areas. Massive hematomas were observed on both hind legs. The stomach contained a large ball of hair mixed with small pieces of bone. An analysis of the liver detected brodifacoum residues of 0.083 ppm.
I007284-001	1997	Registered use	Highly probable	CA	Residential	Fox (2)	Two feral foxes were recovered from a residential address and sent to the Department of Fish and Game Pesticide Investigations Unit for necropsy and tissue analysis. The stomach contents of both animals consisted of feathers, small amounts of grain and rodent bones and hair. An analysis of the livers detected brodifacoum residues of 0.05 ppm in one fox and based on the presence of free blood and congested organs in both foxes, brodifacoum was likely the cause of death.
I007285-001	1997	Undetermined	Highly probable	CA	Residential	Mountain Lion (1)	A mountain lion was observed at a residential address drinking water from a swimming pool. The animal was observed dead the following day and submitted to an animal hospital. Acute hemorrhaging was present in the lungs and in the stomach. An analysis of the liver detected brodifacoum residues at 0.52 ppm.
I007286-001	1996	Undetermined	Highly probable	CA	Residential	Eagle (1)	A golden eagle was found dead and sent to the Department of Fish and Game Wildlife Investigations Laboratory for necropsy. The bird has numerous subcutaneous hematomas and free blood observed in the mouth. An analysis of the liver detected brodifacoum residues at 0.13 ppm.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I007599-002	1998	Undetermined	Possible	GA	N/R	Owl (2)	Two Great Horned Owls were found alive within a two weeks period. Both owls were sick when located and died the next day. The owls were later submitted for necropsy. The first owl had a moderate distention of the pericardial sac with serous fluid mixed with strands of yellowish, fibrinous material. The ventriculus contained a pellet of hairs and bone fragments. The second owl had a moderate amount of undigested material later upon analysis proving to be a chicken liver. An analysis of the livers detected brodifacoum residues at 0.226 ppm and 0.099 ppm in the owls.
I007615-004	1997	N/R	Highly probable	CA	Residential	Coyote (1)	To comply with 6(a)2 regulations, Zeneca reported that a carcass of a juvenile coyote was found in Augora Hills, CA. An examination by the California Department of Fish and Game found brodifacoum in the liver tissue at 0.28 ppm.
I007615-005	1997	Undetermined	Highly probable	CA	Golf Course	Bobcat (1)	To comply with 6(a)2 regulations, Zeneca reported the death of an adult female bobcat that was found in a stream bed near a golf course. It had been fitted with a radio collar, indicating it had been dead for about 9 days. The stomach contents were very dark red-brown in color with mats of animal hair. A subsequent analysis by the state's Fish and Wildlife's Investigations Laboratory indicated brodifacoum was present in the liver at 0.049 ppm.
I007821-001	1998	N/R	Highly probable	NY	Field	Owl (1)	A Great Horned Owl was found dead with a dead rat found next to the owl. The owl had hemorrhaging in the muscles near the left humerus, the left breast, and the bone of the synsacrum. In the lower thoracoabdominal cavity, there was hemorrhaging and a pool of poorly clotted blood. Liver analysis detected brodifacoum residues at 0.12 ppm. No other anticoagulants detected.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I007821-003	1997	N/R	Possible	NY	Field	Eagle (1)	A golden eagle was found and submitted to a hospital for care where it died one week later. It was received by a wildlife pathology unit the same day. White lab mice were present in the lower esophagus, proventriculus, and gizzard. Blood tinged serous fluid was present in the pericardium, the lungs were hemorrhagic, and the air sacs were cloudy. Analysis of tissues found 11 ppm of lead in the liver and 0.016 ppm brodifacoum. It was determined lead intoxication was the most likely cause of death with a probable contribution from brodifacoum.
I008142-001	1998	Undetermined	Highly probable	NY	Residential	Hawk (1)	A red-tailed hawk was found dead in the woods behind a house in a residential area and submitted to a wildlife pathology unit for analysis. An area of hemorrhage was present at the right tibiotarsal-tarsometatarsal joint. An analysis of the liver detected brodifacoum residues of 0.56 ppm. No other anticoagulants detected.
I008146-001	1998	Undetermined	Probable	NY	Field	Owl (1)	A Great Horned owl was found dead in a field area. Analysis of the liver detected brodifacoum residues at 0.03 ppm, bromodiolone residues at 0.77 ppm, and warfarin residues at 0.73 ppm. It was determined that higher concentrations of warfarin and bromodialone likely played more of a part in the eagle's death but brodifacoum played some part.
I008152-001	1998	N/R	Highly probable	NY	Residential	Hawk (1)	A red-tailed hawk was found in a residential area and submitted to a wildlife pathology unit. An analysis of the liver detected brodifacoum residues of 0.04 ppm. No other anticoagulants detected.
I008309-001	1998	Undetermined	Probable	CA	Field	Owl (1)	The California Department of Fish and Game recovered a dead great horned owl that was allegedly due to brodifacoum and diphacinone poisoning. Liver analysis did not find diphacinone residues but detected brodifacoum at 0.6 ppm.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I008851-001	1999	Undetermined	Possible	NY	Residential	Hawk (1)	A red-tailed hawk was found debilitated in a on the side of a road in a residential area and died two days later. Extensive hemorrhage was present in the synsacrum and the left kidney. The hawk had regurgitated a mass of forming pellet that contained rodent parts. Brodifacoum was present in the liver a 0.69 ppm but there is also clear evidence of severe trauma possibly from being hit by a motor vehicle. Brodifacoum, to some extent, was an additional cause in the bird's death
I008852-001	1999	Undetermined	Highly probable	NY	Residential	Squirrel (3)	Three squirrels had been observed drinking water and were later found dead in a backyard of a residence. The first squirrel had hemorrhages in the medial aspect of the left elbow, the anterior right thigh, and in the lung. Blue-green material was present in the mouth, esophagus, and stomach. The second squirrel had hemorrhages in the ventral neck, the left side of the head, the medial and lateral aspect of the right hind leg, and in the left lung. The third squirrel had hemorrhages in the lateral aspect of the lower right hind leg, caudal and medial aspects of the left foreleg, thymus, and lungs. Liver analysis of the three squirrels ranged from 6.4 to 6.9 ppm brodifacoum. No other anticoagulants detected.
I008900-001	1999	Undetermined	Highly probable	NY	Field	Owl (1)	A Great Horned Owl was found dead in a wooded area and was submitted to a wildlife pathology unit. The stomach contained bloody fluid but no evidence of blood clots were found. An analysis of the liver detected brodifacoum residues at 0.16 ppm. No other anticoagulants detected
I008901-001	1999	Undetermined	Probable	NY	Field	Owl (1)	A Great Horned Owl was found dead and collected for examination. An analysis of the liver detected brodifacoum at 0.23 ppm. An analysis of the brain enzymes detected oxychlordan at 2.5 ppm. It was determined the chlordan metabolite was the principal factor in the bird's death but

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
							brodifacoum may have played a role.
I008914-001	1999	Undetermined	Highly probable	NY	Field	Hawk (1)	A red-tailed hawk was found debilitated and died in transport to a wildlife pathology unit. An analysis of tissues showed brodifacoum residues at 0.32 ppm and potentially lethal levels of chlordane in the brain. It was likely both contributed to death.
I009060-001	1998	Legal use	Highly probable	NY	Field	Eagle (1)	A golden eagle was found dead and subsequent tissue analysis detected brodifacoum in the liver at 0.06 ppm, bromodiolone at 0.24 ppm, and 0.17 ppm lead. It was determined that the brodifacoum and bromodiolone residues were the cause of the bird's death
I009067-001	1999	Misuse (Intentional)	Highly probable	NY	Residential	Squirrel (1)	A grey squirrel was found dead in a residential area and the property owner claimed a neighbor was illegally killing small mammals around her residence. Hemorrhage was present in the musculature around the left humerus, and left and right femur. The stomach contained nut meats Liver analysis detected brodifacoum residues at 3.12 ppm. No other anticoagulants detected.
I009068-001	1999	Undetermined	Highly probable	NY	Residential	Squirrel (1)	A grey squirrel was submitted to a wildlife pathology unit after it was found dead in a residential area. The lungs were hemorrhagic as well as the abdominal cavity. The stomach contained what appeared to be chewed tree buds. An analysis of the liver detected brodifacoum residues at 6.3 ppm. No other anticoagulants detected.
I009069-001	1999	Undetermined	Highly probable	NY	Residential	Skunk (1)	A skunk was reportedly found in the yard of a residence. The skunk did not spray, and seemed to have limited movement. The skunk was euthanized at a wildlife pathology unit. Liver analysis detected brodifacoum residues at 1.05 ppm. No other anticoagulants detected

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I009070-001	1999	Undetermined	Highly probable	NY	Residential	Coyote (1)	A dead coyote was found at a residence wand received by a wildlife pathology unit a day later. The carcass had undergone moderate to severe autolysis. The lungs appeared hemorrhagic. An analysis of the liver detected brodifacoum residues of 0.93 ppm. No other anticoagulants detected
I009071-001	1999	Undetermined	Highly probable	NY	Residential	Squirrel (1)	A squirrel had been found shaking and seemed unable to move on its own. The squirrel later died necropsy showed a large hemorrhage in the wall of the abdominal cavity. The stomach contained finely ground material with a greenish tint from vegetation and nut meats. A rabies test was negative but liver analysis detected brodifacoum residues at 0.23 ppm. No other anticoagulants were detected.
I009099-001	1998	Undetermined	Highly probable	NY	Residential	Crow (2)	Two dead crows were found in the yard of a residential area. The crows were later received by a wildlife pathology unit for necropsy. Both crows had hemorrhagic lungs in and the gizzards contained yellowish-white granules. Pooled liver samples showed brodifacoum residues of 0.14 ppm.
I009102-001	1998	Undetermined	Highly probable	NY	Residential	Opossum (1)	An opossum was found dead at a residential address and was submitted to the NY Department of Environmental Conservation for examination. The stomach contained soil and earthworms. An analysis of the liver detected brodifacoum residues at 0.24 ppm. No other anticoagulants detected.
I009104-001	1998	Undetermined	Highly probable	NY	N/R	Owl (1)	A Great Horned Owl was found dead and collected for examination. An analysis of the liver detected brodifacoum residues of 0.08 ppm and bromodialone residues of 0.27 ppm. It was determined that both anticoagulants played a role in the bird's death.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I009107-001	1999	Undetermined	Probable	NY	Residential	Owl (1)	A Great Horned Owl was dead in a driveway of a residential address and received by a wildlife pathology unit 4 days later. The stomach contained a forming pellet of small mammal hair. Hemorrhage into soft tissue and plumage was present. Chemical residue analysis showed the DDT metabolite DDE at high but not lethal levels as well as dieldrin present at 25 % of the lethal levels. Brodifacoum was also present at 0.036 ppm. The primary cause of death was attributed to head trauma but brodifacoum and other pesticides could have played a role. No other anticoagulants detected.
I009109-001	1997	Undetermined	Highly probable	NY	Residential	Squirrel (1)	A grey squirrel was found dead in a residential area and arrived in a frozen state to a wildlife pathology unit. Areas of hemorrhage were present around the anus, scrotum, and the hind legs. The stomach contained a black paste appearing to be hemolyzed blood exposed to stomach acid. The lungs were hemorrhagic. An analysis of the liver detected brodifacoum residues at 0.88 ppm. No other anticoagulants detected.
I009112-001	1999	Undetermined	Highly probable	NY	Residential	Hawk (1)	A red-tailed hawk was found debilitated at a residential address and was submitted to a wildlife pathology unit a day later where it subsequently died. The hawk cast a pellet of fur and bones and among its recent meals were field voles. Severe blood loss signs were noted. An analysis of the liver detected brodifacoum residues at 0.16 ppm. No other anticoagulants detected.
I009114-001	1999	Undetermined	Highly probable	NY	Field	Owl (1)	A Great Horned Owl was found dead near a partially eaten muskrat carcass. The right foot and pad had a small ulceration and the leg plumage was smeared with dried blood. A puncture wound was present between the eyes and the sinuses. The stomach contained a large pellet of muskrat hair and bone. Liver analysis detected brodifacoum residues at 0.30 ppm. No other anticoagulants detected.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I009116-001	1999	Undetermined	Highly probable	NY	Urban	Hawk (1)	A red-tailed hawk was found dead in an urban area and submitted to a wildlife pathology unit 2 weeks later. There was blood in the mouth and a hemorrhage in the matrix of the skull but no head fractures were present. A large amount of unclotted blood was present in the thoraco-abdominal cavity. The hawk's stomach contained the hair, bones, and teeth of a common rat. Liver analysis detected brodifacoum residues at 0.23 ppm. No other anticoagulants detected.
I009120-001	1999	Undetermined	Highly probable	NY	Residential	Hawk (1)	A red-tailed hawk was found at a residential address. The bird seemed dehydrated upon submission to Volunteers for Wildlife and died an hour before arrival. A large area of unclotted hemorrhage was present surrounding the right humerus and radius ulna area. A liver analysis detected brodifacoum residues at 0.13 ppm. No other anticoagulants detected.
I009122-001	1999	Undetermined	Highly probable	NY	Residential	Owl (1)	A female owl was observed at her nest and three weeks later appeared lifeless. The owl was checked and found to be dead. The nest contained three eggs and four rats, one partially consumed. The owl and eggs were submitted to a wildlife pathology unit. An area of hemorrhage was noted over the sternum and furculae. A liver analysis showed brodifacoum residues of 0.08. No other anticoagulants detected.
I009124-001	1999	Undetermined	Highly probable	NY	Residential	Owl (1)	A dead long-eared owl was found in a residential area and submitted to a wildlife pathology unit 2 weeks later. There was a hemorrhage present in the lungs and around the heart. Portions of a sparrow sized bird were found in the stomach. An analysis of the liver detected brodifacoum residues of 0.30 ppm. No other anticoagulants detected.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I009126-001	1999	Undetermined	Highly probable	NY	Field	Hawk (1)	A red-tailed hawk was found dead and was later submitted to necropsy. There was a large hemorrhage over the ventral crop. A puncture wound was present over the medial aspect of the knee. A liver analysis showed brodifacoum residues of 1.26 ppm. No other anticoagulants detected.
I009127-001	1999	Undetermined	Highly probable	NY	Residential	Hawk (1)	A red-tailed hawk was dead on a driveway of a residential address, submitted to Volunteers for Wildlife and received by a wildlife pathology unit a month later. The stomach contained a leaf, animal tissue, and a tendon. Liver analysis detected brodifacoum residues of 0.80 ppm. No other anticoagulants detected.
I009267-001	1999	Undetermined	Highly probable	NY	Residential	Owl (1)	A Great Horned Owl was found dead and the bird was submitted to a wildlife pathology unit. A bloody, pasty like material was present around the vent. The stomach contained grayish hairs and a large area of hemorrhage was present in the ventral thoraco-abdominal wall. A liver analysis showed brodifacoum residues at 0.64 ppm. No other anticoagulants detected.
I009268-001	1999	Undetermined	Highly probable	NY	Residential	Fox (1)	A grey fox was found dead on the side of a road in a residential area and arrived at a wildlife pathology unit one day later. The lungs were hemorrhagic and a large quantity of bloody fluid was present in the thorax. An analysis of the liver detected brodifacoum residues of 0.35 ppm. No other anticoagulants detected.
I009269-001	1999	Undetermined	Highly probable	NY	Residential	Squirrel (1)	A grey squirrel was found dead at a residential address. This was the third dead squirrel found in two days. Fertilizer and insecticides had been used on the lawn recently. The squirrel was later received by a wildlife pathology unit. The heart appeared empty of blood and the lungs were hemorrhagic. An analysis of the liver detected brodifacoum residues of 2.4 ppm. No other anticoagulants detected.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I009594-001	1999	Undetermined	Highly probable	NY	Residential	Squirrel (1)	A grey squirrel was found dead in the backyard of a residence and submitted to a wildlife pathology unit one week later. In the previous couple of months, dead squirrels had been sighted in neighboring yards. Subcutaneous hemorrhaging was present around the left forearm and ribcage. An analysis of the liver detected brodifacoum residues at 2.4 ppm. No other anticoagulants detected.
I009595-001	1999	Undetermined	Highly probable	NY	Residential	Squirrel (1)	A grey squirrel was found dead at the College of St. Rose in Albany. And submitted to wildlife pathology the same day. The thorax was filled with unclotted blood. Hemorrhage was present in the throat, under the mandibles, and on the right side of the head. An analysis of the liver detected brodifacoum residues at 2.1 ppm. No other anticoagulants detected.
I009649-001	1999	N/R	Highly probable	NY	Residential	Owl (1)	A Great Horned Owl was injured in the backyard of a residence. The bird died a day later and was necropsied. There was no sign of trauma an analysis of the liver detected brodifacoum residues at 0.42 ppm. No other anticoagulants detected
I009713-001	1999	N/R	Highly probable	NY	Residential	Squirrel (1)	A grey squirrel was found dead at a residential address and later submitted to a wildlife pathology unit. The blood was poorly clotted and had a thick syrupy appearance. An analysis of the liver detected brodifacoum residues of 0.31 ppm.
I009714-001	1999	Undetermined	Highly probable	NY	Residential	Owl (1)	A Great Horned Owl was found dead in the backyard of a residence and necropsied the next day. There was subcutaneous hemorrhage over the ventral abdomen. Extensive hemorrhage was present in the fatty tissue in the thoracoabdominal cavity. Two garter snakes were present in the stomach. An analysis of the liver detected brodifacoum residues of 0.14 ppm. No other anticoagulants detected.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I009716-001	1999	Undetermined	Highly probable	NY	Residential	Owl (1)	An Eastern Screech Owl was found dead in the driveway of a residential address. The bird was submitted to wildlife pathology units for concerns of West Nile Virus. A large hemorrhage was present over the left anterolateral pectoral muscle and lateral aspect of the right tarsometatarsus. An analysis of the liver detected brodifacoum residues of 0.16 ppm. No other anticoagulants detected.
I009775-001	1999	Undetermined	Highly probable	NY	Residential	Crow (1)	A crow was found dead in a residential area and received by a wildlife pathology unit 2 days later. There was initial concern of West Nile Virus. There was hemorrhage present into the pericardial sac and within the cardiac musculature. Hemorrhage was present in both lungs and around the right lobe of the liver. The test for West Nile was negative. An analysis of the liver detected brodifacoum residues of 1.67 ppm. No other anticoagulants detected.
I009967-001	2000	Undetermined	Highly probable	NY	Field	Weasel (1)	A long-tailed weasel was found in a field area and wasn't walking normally, possibly having a problem with its front legs. It later died and was submitted to a wildlife pathology unit the same day. There was hemorrhage throughout the lungs and in the abdominal cavity. An analysis of the liver detected brodifacoum residues of 0.07 ppm. No other anticoagulants detected.
I009972-001	2000	Undetermined	Highly probable	NY	Urban	Hawk (1)	A sharp-shinned hawk was seen in a warehouse and could not fly out to avoid capture. The bird was found dead 3 days later. It was originally suspected to die from starvation. A small hemorrhage was present in the superficial muscle of the left sternal region. The stomach contained a bloody paste. The intestines and kidneys were black with hemorrhage. An analysis of the liver detected brodifacoum residues at 0.17 ppm. No other anticoagulants detected.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I010002-017	1999	Undetermined	Highly probable	CA	Field	Squirrel (8)	This incident was part of a 1999 report of the Pesticide Investigations Unit of the Department of Fish and Game in California. Eight fox squirrels were listed to have died from brodifacoum poisoning although no confirmatory chemical residue analysis was provided in the report.
I010002-026	1999	N/R	Highly probable	CA	N/R	Owl (1)	This incident was part of a 1999 report of the Pesticide Investigations Unit of the Department of Fish and Game in California. One Great Horned Owl was listed to have died from brodifacoum poisoning although no confirmatory chemical residue analysis was provided in the report.
I010002-031	1999	N/R	Highly probable	CA	Field	Bobcat (1)	This incident was part of a 1999 report of the Pesticide Investigations Unit of the Department of Fish and Game in California. A bobcat was listed to have died from brodifacoum poisoning although no confirmatory chemical residue analysis was provided in the report.
I010137-001	2000	Undetermined	Highly probable	NY	Residential	Hawk (1)	A red-tailed hawk was found dead in a residential area and submitted to a wildlife pathology unit 2 days later over concerns of West Nile virus. No blood was present in the heart and an area of subcutaneous hemorrhage extended from the mid-sternum caudally over the abdomen and laterally down the left leg. An analysis of the liver detected brodifacoum residues of 0.94 ppm. No other anticoagulants detected.
I010192-001	1999	Registered use	Highly probable	NY	Residential	Squirrel (2)	Two grey squirrels were found dead at a residential address. Scientific Exterminators were using bait station blocks at a nearby deli that were placed outside. The stomachs of both squirrels contained turquoise green material. Liver analyses on both squirrels detected brodifacoum residues of 0.25 and 0.70 ppm. No other anticoagulants were detected.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I010255-001	2000	Misuse (intentional)	Highly probable	NY	Residential	Squirrel (2)	Two grey squirrels were found dead in a residential area and were submitted to a wildlife pathology unit a day later. One squirrel had hemorrhages present in the ventral throat and medial aspect of the left hind leg. The second squirrel had small hemorrhages distributed over the shoulders and the lateral aspects of the abdomen. Brodifacoum residues in the liver were 8.3 and 4.1 ppm.
I010382-001	1998	Misuse (intentional)	Highly probable	WI	Residential	Squirrel (5)	Five grey squirrels and 3 eastern chipmunks were found dead at a residence. The three chipmunks were submitted to Wildlife Health for analysis. Hemorrhage of most internal organs was evident, and stomachs were filled with white pasty material. An analysis of the pooled liver samples detected brodifacoum residues although no levels were provided in the report.
I010383-001	1997	Misuse (intentional)	Highly probable	WI	Residential	Squirrel (2)	Two grey squirrels were found dead in a residential area and necropsied. Evidence of hemorrhaging of most internal organs was present and there abundant free blood in the abdominal body cavity. There was a bright blue-green pelleted compound present in the stomachs of two squirrels. Liver analysis detected brodifacoum residues although the value of the residues and the chemical residue analysis report was not provided with this incident report.
I010384-001	1995	Misuse (intentional)	Highly probable	WI	Residential	Squirrel (2)	Two grey squirrels were found dead in a residential area. Large blue waxy squares (resembling many over-the-counter type rodenticides) were found in the stomachs of the squirrels. A high quantitative amount of brodifacoum was detected in the livers but no chemical analysis report was provided in the incident report.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I010385-001	1995	Misuse (intentional)	Highly Probable	WI	Residential	Squirrel (1)	A grey squirrel was collected in a residential area where many squirrels have been dying recently, approximately 30 in a seven month span. A plastic dish filled with peanut butter and green pellets was found close to the dead squirrel indicating an intentional poisoning. Brodifacoum was detected in the peanut butter/pellet mixture at 3 ppm and in the liver of the squirrel at 1.8 ppm. The peanut butter-pellet mixture was not placed according to label directions.
I010386-001	1998	N/R	Highly probable	WI	Field	Eagle (1)	A American Bald Eagle was found alive and taken to an animal hospital but died soon after being admitted. While alive, the eagles was observed to regurgitate rotten smelling meat and had difficulty standing or maintaining balance. Internal organs revealed hemorrhage and free blood was apparent in the body cavity. The crop was filled with small mammal muscle tissue, bones, and fur. A liver analysis detected brodifacoum residues although the value of the residues and the chemical residue analysis report was not provided with this incident report
I010387-001	2000	Registered use	Highly probable	WI	Field	Hawk (1)	A red-tailed hawk was found dead near a barn that used rat poison. Upon submission to Wildlife Health, it was found brodifacoum residues were present in the liver although the value of the residues and the chemical residue analysis report was not provided with this incident report
I010387-002	2000	N/R	Probable	WI	Field	Hawk (1)	A red-tailed hawk was found dead and submitted to Wildlife Health for necropsy. An analysis of the liver detected brodifacoum residues and analysis of brain enzyme activity revealed significant cholinesterase depression. The carbamate insecticide carbofuran was detected in crop content and liver tissue. The cause of death was determined to be due to the activity of both chemicals.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I010388-001	2000	N/R	Highly probable	WI	Field	Hawk (1)	A red-tailed hawk was found in a field area by a woman on a hike. It was submitted to Wildlife Health for a diagnostic necropsy. Internal free blood was visible in the lower abdominal region. The upper intestinal tract was filled with hair, meat, and bones from a small rodent. An analysis of the liver detected brodifacoum residues although the value of the residues and the chemical residue analysis report was not provided with this incident report
I010701-001	2000	N/R	Highly probable	WI	Residential	Hawk (1)	A red-tailed hawk was found dead on a residential lawn and submitted to Wildlife Health for necropsy. Subdural hemorrhage was present at the base of the skull. There was abundant free blood in the lower abdominal region. The crop was filled with hair, meat and bones from a small rodent. A liver analysis detected brodifacoum residues at 0.003 ppm.
I010701-002	2000	N/R	Highly probable	WI	Residential	Hawk (1)	A red-tailed hawk was found ill in a residential area and died approximately 15 minutes prior to collection by a wildlife rehabilitator. Necropsy showed no evidence of physical trauma and the crop was filled with an unidentified meat/muscle. A liver analysis detected brodifacoum residues at 0.02 ppm.
I010701-003	2000	N/R	Highly probable	WI	Residential	Hawk (1)	A red-tailed hawk was found dead on a residential lawn and submitted to Wildlife Health for necropsy. Physical trauma was evidenced by a massive subdural hemorrhage at the base of the skull. The crop was filled with hair and meat from a small mammal. An analysis of the liver detected brodifacoum residues at 0.009 ppm.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I010701-004	2000	N/R	Highly probable	WI	Field	Hawk (2)	A red-tailed hawk and Cooper's hawk were found dead within one day of each other on a farm and submitted to Wildlife Health for necropsy. The red-tailed hawk had massive subdural and brain hemorrhage present. Crops of both hawks were filled with unidentified meat/muscle. Liver analysis of the pooled sample of both hawks detected brodifacoum residues at 0.03 ppm.
I011005-001	2000	N/R	Highly probable	NY	Residential	Owl (1)	A Great Horned Owl was found dead hanging upside down in a tree on a residential property and was submitted to a wildlife pathology unit. Extensive subcutaneous hemorrhage was present in the left wing. A small hemorrhage was present in the neck and behind the head on the right side. An analysis of the liver detected brodifacoum residues of 0.09 ppm. No other anticoagulants detected.
I011066-001	2000	N/R	Highly probable	NY	Urban	Hawk (1)	A red-tailed hawk was found dead in a park in Manhattan lying face down. The bird was necropsied four days later. The stomach contained a pellet of small mammal hair and bone. A few hard pellet like concretions were present in the large intestine contents (4-5 mm in diameter, reddish, and fairly homogenous). An analysis of the live detected brodifacoum residues at 0.24 ppm. No other anticoagulants detected.
I011068-001	2000	N/R	Probable	NY	Residential	Hawk (1)	A red-tailed hawk was found dead in a residential area and received by the county Health Department the same day for necropsy. Extensive hemorrhaging was present in the soft tissues along the full length of the left humerus. The stomach contained bile-stained feathers. An analysis of the live detected brodifacoum residues at 0.08 ppm. No other anticoagulants detected.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I011274-001	1981	Registered use	Probable	DC	Zoo	Unknown birds (12)	The registrant ICI conducted analyses that indentified brodifacoum residues in a dozen birds that allegedly died as a result of eating insects that had presumably fed on TALON bait placed inside bait boxes. No mention was made of the possibility that the birds had fed on rodents which would be the target species of the bait boxes now was there any confirmatory chemical residue analysis included in the incident report.
I011299-001	2001	Undetermined	Highly probable	WI	Field	Hawk (1)	A rd-tailed hawk was found dead and was submitted to Wildlife Health for necropsy where it was found that brodifacoum residues at 0.04 ppm were present in the liver.
I011299-002	2000	Undetermined	Highly probable	WI	Field	Hawk (2)	In a one month period of time, eight red-tailed hawks were found alive but ill when they were taken to a wildlife rehabilitation center and treated. Eventually, two died and necropsies showed evidence of massive subdural hemorrhage. Liver analysis showed brodifacoum residues of 0.008 pm.
I011299-003	2001	Undetermined	Highly probable	WI	Residential	Hawk (1)	A red-tailed hawk was found dead and submitted to Wildlife Health for necropsy. Analysis showed there was no internal free blood and brodifacoum residues were at 0.02 ppm in the liver.
I011299-004	2001	Undetermined	Highly probable	WI	Residential	Hawk (1)	A red-tailed hawk was found dead and collected for examination. An analysis of the liver detected brodifacoum at 0.11 ppm.
I011299-005	2000	N/R	Highly probable	WI	Field	Hawk (1)	A red-tailed hawk was found dead and hanging from a tree limb. It was submitted to Wildlife Health where a internal lining hemorrhage was found in the lower intestinal tract. The crop was partially filled with hair, meat, and bones from a small rodent. Brodifacoum was found to be in the liver at 0.014 ppm.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I011299-006	2000	Undetermined	Highly probable	WI	Field	Hawk (1)	A red-tailed hawk was found dead in a field area. It was submitted to Wildlife Health where its internal organs were filled with blood. The crop was partially filled with unidentified meat and muscle. Brodifacoum was found in the liver tissue at 0.04 ppm.
I011303-001	1987	Legal use	Highly probable	CO	Zoo	Various bird species (5)	Brodifacoum in the form on TALON WEATHER BLOK was used at a zoo. Two Franklin's gulls, one laughing gull, one plover, and one unknown bird were observed dead or dying at the site. An analysis of the liver detected brodifacoum residues of 1.5 ppm and 1.6 pm for the Franklin's gulls, 1.6 ppm for the laughing gull, 0.8 ppm for the plover, and 0.5 ppm for the unknown bird.
I011429-001	2001	Undetermined	Highly probable	NY	Residential	Hawk (1)	A Cooper's hawk was found dead in a residential area and necropsied later that day. There was a massive subcutaneous hemorrhage along the left lateral breast musculature and over the right scapula. Liver analysis showed brodifacoum residues at 0.18 ppm. No other anticoagulants detected.
I011517-001	2000	N/R	Possible	NY	Residential	Hawk (1)	A red-tailed hawk was found dead in a residential area and later received by the Wildlife Pathology Unit. The hawk's sternum was fractured and the thoracoabdominal cavity contained a large quantity of largely unclotted blood. An analysis of the liver detected brodifacoum residues of 0.32 ppm. The ultimate diagnosis was blunt impact trauma but it was determined that the health of this bird was severely threatened by brodifacoum.
I011539-001	2001	N/R	Highly probable	NY	Residential	Crow (1)	An American crow was found dead in a residential area and was later received by the Wildlife Pathology Unit. The crow had hemorrhaging along the right atrial area. The lungs were filled with bloody fluid and the blood in the heart was poorly clotted. An analysis of the liver detected brodifacoum residues of 0.4 ppm.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I011540-001	2001	Undetermined	Highly probable	NY	Residential	Hawk (1)	A red-tailed hawk was found dead at the New York State Department of Environmental Conservation's Five Rivers Environmental Education Center and necropsied a day later. The heart chambers were largely devoid of blood and the ventriculus contained a recently ingested short tailed shrew. Brodifacoum residues of 0.03 ppm were detected in the liver. No other anticoagulants detected.
I011541-001	2001	Undetermined	Highly probable	NY	Residential	Crow (1)	An American crow was found dead at Albany Medical Center and submitted to a Wildlife Pathology Unit the same day. Chemical residue analysis showed brodifacoum at 0.45 pm in the liver. No other anticoagulants detected.
I011587-001	2000	N/R	Unlikely	NY	Residential	Hawk (1)	A Cooper's Hawk was found dead in a residential area and submitted to pathology for necropsy the next day. There were hemorrhages in the lungs and air sacs. The ventriculus contained small mammal hair. Liver analysis showed brodifacoum residues of 0.21 pm. The test for West Nile Virus was positive and therefore was determined to be the primary cause of death.
I011588-001	2000	Undetermined	Probable	NY	Residential	Owl (1)	A great horned owl was found emaciated weak and had dilated pupils. The owl died the same day and was submitted to Volunteers for Wildlife. Liver analysis showed 0.37 pm brodifacoum and 0.4 ppm of bromadiolone.
I011589-001	2000	Undetermined	Highly probable	NY	Residential	Crow (1)	A crow was found dead in a residential area and submitted to pathology a day later. A very large area of subcutaneous hemorrhage was present over the dorsal aspect of a femur. Liver analysis showed brodifacoum residues at 1.0 ppm. No other anticoagulants detected.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I011590-001	2000	Undetermined	Highly probable	NY	Residential	Crow (1)	A crow was found dead in a residential area and received for necropsy the same day. There was extensive hemorrhaging in the musculature of the right lower leg. Hemorrhaging was also present in the lower left leg. Liver analysis showed brodifacoum residues of 1.2 ppm. No other anticoagulants detected.
I011592-001	2001	Undetermined	Highly probable	NY	Field (forest)	Owl (1)	A great horned owl was found alive in the woods in a weak state. The owl died shortly thereafter and was necropsied a day later. An analysis of the liver showed brodifacoum residues at 0.49 ppm. No other anticoagulants detected.
I011608-001	2000	Undetermined	Highly probable	CA	Residential	Owl (1)	A dead horned owl was found at Chaparall School in Claremont CA. It was given to the president of the Pomona Valley Audubon Society, Dan Guthrie, who examined the bird but found no broken bones. Analysis later showed the presence of brodifacoum.
I011608-002	2000	Undetermined	Probable	CA	Residential	Hawk (2)	Two Cooper's hawks were found dead at the Botanic Garden at Harvey Mudd College in Claremont, CA. One bird was determined to be dead from starvation while the other had suffered a massive hemorrhage.
I011608-003	2000	Undetermined	Highly probable	CA	Residential	Owl (1)	A great horned owl was found dying at Scripps College in Claremont, CA and later died that night. Necropsy showed that the bird had died of brodifacoum toxicosis.
I011613-001	2001	Undetermined	Possible	NY	Residential	Vulture (1)	A turkey vulture was found on the ground standing motionless. It was found dead two days later and picked up to be submitted to pathology. A preliminary diagnosis was made of lead poisoning although liver analysis showed brodifacoum residues of 0.26 ppm. The bird appeared to be weakened by lead intoxication and brodifacoum was thought to contribute to the mortality.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I011614-001	2000	Undetermined	Probable	NY	Residential	Crow (1)	A juvenile American crow was found dead in a residential area and submitted to pathology. There were massive hemorrhages in both lungs and a hemorrhage in the calvarium. The ventriculus contained cucumber-like seeds and flesh. Analysis showed brodifacoum residues at 0.08 ppm in the liver. No other anticoagulants detected.
I011650-001	2000	Undetermined	Possible	NY	N/R	Owl (1)	A Great Horned Owl was found dead and collected for examination. An analysis of tissues for organochlorine pesticides in the brain detected oxychlordan at 3.0 ppm, the DDT metabolite DDE at 31 ppm, dieldrin at 3.9 ppm and chlordane at 0.36 ppm. An analysis of the liver also detected brodifacoum residues at 0.05 ppm. It was determined that brodifacoum contributed to the death of the owl.
I011651-001	2000	Undetermined	Probable	NY	N/R	Owl (1)	A Great Horned Owl was found dead and collected for examination. An analysis of the liver detected brodifacoum at 0.15 ppm and bromodialone at 0.32 ppm.
I011871-001	2000	Undetermined	Possible	NY	Residential	Owl (1)	A screech owl was found at taken for rehabilitation when it was found to fly weakly and have dark droppings. The owl died during rehabilitation and was submitted to pathology. The stomach of the owl contained white fur from lab mice. Brodifacoum was present at 0.16 ppm in the liver. No other anticoagulants detected.
I011872-001	2000	Undetermined	Possible	NY	Residential	Raccoon (1)	An adult male raccoon was submitted by a park ranger after being found in Manhattan. There was a massive hemorrhage in the thoracic cavity and the lungs were hemorrhagic. Chemical residue analysis showed brodifacoum residues of 0.14 ppm in the liver. No other anticoagulants detected.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I011873-001	2000	N/R	Highly probable	NY	Residential	Hawk (1)	A red-tailed hawk was found dead and necropsy showed extensive hemorrhaging in the right lower leg. An analysis of the liver show brodifacoum concentrations at 0.38 ppm. No other anticoagulants detected.
I012054-001	2001	N/R	Highly probable	NY	Residential	Squirrel (1)	A grey squirrel was found dead and sent to pathology where a massive hemorrhage was present over the abdomen. The lungs were also hemorrhagic and unclotted blood was present in the thoracic and abdominal cavities. Liver analysis confirmed brodifacoum residues at 0.35 ppm. No other anticoagulants detected.
I012055-001	2001	N/R	Highly probable	NY	Residential	Crow (1)	A crow was found dead and sent to pathology where severe hemorrhaging over the ventral left abdominal region and extending down the left leg. Hemorrhaging was also present in the kidneys and liver analysis showed brodifacoum concentrations at 1.3 ppm. No other anticoagulants detected.
I012056-001	2001	N/R	Highly probable	NY	Residential	Crow (1)	An American crow was found and the carcass sent to pathology. An area of hemorrhage was present over the right rib cage and the blood was poorly clotted in the heart. An analysis of the liver showed brodifacoum concentrations to be at 0.52 ppm. No other anticoagulants detected
I012057-001	2001	N/R	Highly probable	NY	Residential	Crow (1)	A crow was found dead and submitted to pathology. A large amount of blood was present in the mouth and the lungs were hemorrhaged. Chemical residue analysis showed brodifacoum in the liver at 0.35 ppm. No other anticoagulants detected
I012398-006	2001	Undetermined	Highly probable	WI	N/R	Hawk (11)	To comply with 6(a)2 requirements, Syngenta reported the deaths of 11 hawks (Cooper's and Red-tailed) in Appleton, WI. The livers of the hawks were analyzed for OP pesticides and brodifacoum. Brodifacoum was detected in all livers at concentrations ranging from 0.019 – 0.12 pm.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I012421-001	2001	Undetermined	Highly probable	NY	Residential	Crow (1)	An American Crow was found dead and collected for examination. An analysis of the liver detected brodifacoum residues at 1.5 ppm.
I012428-001	2001	Undetermined	Probable	NY	Residential	Squirrel (1)	A grey squirrel was found dead that was one of eight found in the area during a two month period. There were extensive subcutaneous hemorrhages around both hind legs. Brodifacoum residues were found to be at 2.64 ppm and no other anticoagulants were detected.
I012429-001	2001	Undetermined	Probable	NY	N/R	Owl (1)	A barred owl was found dead with the lungs hemorrhagic. An analysis of the liver showed brodifacoum residues at 0.04 ppm. No other anticoagulants detected
I012430-001	2001	Undetermined	Probable	NY	Field	Owl (1)	A great horned owl was found dead along a highway and submitted for pathology. Subcutaneous hemorrhaging was found in the distal left tibiotarsus. Brodifacoum residues were present in the liver at 0.84 ppm and no other anticoagulants were detected.
I012430-001	2001	Undetermined	Probable	NY	Field	Owl (1)	A great horned owl was found dead along a highway and submitted for pathology. Subcutaneous hemorrhaging was found in the distal left tibiotarsus. Brodifacoum residues were present in the liver at 0.84 ppm and no other anticoagulants were detected.
I012431-001	2001	Undetermined	Probable	NY	Residential	Crow (1)	An American crow was found dead in a residential area and received by a pathology unit 10 days later. A massive hemorrhage had occurred in the thoraco-abdominal cavity and lungs. The ventriculus contained small mammal hair. Brodifacoum residues were found in the liver at 0.07 ppm. No other anticoagulants detected.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I012440-001	2001	Undetermined	Probable	NY	Residential	Squirrel (3)	Three grey squirrels were found dead and picked up by the County Department of Health to be submitted for pathology. All showed subcutaneous hemorrhage and a moderate volume of unclothed blood. Turquoise-green ground grain material was found in the mouth of the first squirrel and the stomach of the third squirrel. Liver residues analysis showed 5.5 ppm brodifacoum in 2 squirrels and 1.03 ppm in the third. No other anticoagulants detected
I012501-001	2001	Undetermined	Highly probable	NY	Residential	Crow (1)	An American Crow was found at a residential property and submitted for pathology. The lungs were hemorrhagic and the liver showed brodifacoum concentrations of 1.9 ppm. No other anticoagulants detected
I012540-001	2001	N/R	Highly probable	NY	Field	Owl (1)	A great Horned Owl was found dead and received by a pathology unit one week later. Hemorrhage was present in the pericardial sac. The liver analysis showed brodifacoum residues at 0.24 ppm but high levels of chlordane and DDT metabolites were also located in the brain. The bird may have become weakened due to brodifacoum poisoning and was later affected by the action of chlordane and DDT.
I012541-001	2001	Undetermined	Highly probable	NY	Residential	Crow (1)	An adult crow was found dead and was found to have heavy hemorrhaging in the lungs. Chemical residues analysis confirmed brodifacoum concentrations of 0.71 ppm in the liver. No other anticoagulants detected
I012660-001	2002	Undetermined	Probable	NY	Residential	Owl (1)	An Eastern Screech Owl was found dead on the east side of Central Park, Manhattan at 72 nd street. A large hemorrhage was present over the ventrocaudal ventriculus and also in and around the developing ova. The ventriculus contained several small balls of small mammal hair. Brodifacoum concentrations were present at 0.91 ppm in the liver. No other anticoagulants detected.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I012662-001	1993	Undetermined	Highly probable	NY	Residential	Squirrel (2)	Two gray squirrels were found dead in the front yard of a home with a third at the same location a week and a half later. Lung hemorrhages were found and liver residues analysis showed brodifacoum concentrations of 5.1 ppm. No other anticoagulants detected.
I012816-001	2001	Undetermined	Highly probable	NY	Residential	Squirrel (1)	A grey squirrel was found dead (second in a week at same location). The bladder was hemorrhagic, and bloody fluid was present in the thorax. The stomach contained a finely ground brown material. The liver contained 3.45 ppm brodifacoum and no other anticoagulants were detected.
I012944-001	2002	Misuse (intentional)	Highly probable	NY	Residential	Squirrel (1)	A grey squirrel was found dead and was reported by the person who found it that it was the third dead squirrel in that location for the last two weeks. This might be a pattern of intentional killings. Brodifacoum is used as a mouse and rat poison and sometimes illegally for squirrels. The stomach of the squirrel contained moderate volume of well ground white/tan nutmeats. An analysis of the liver showed brodifacoum residues of 0.82 ppm.
I012945-001	2001	Undetermined	Highly probable	NY	Residential	Owl (1)	A great horned owl was found dead and submitted for pathology. A puncture wound was on one tow and dried blood was matted on the nearby plumage. There were several hemorrhages and a trace of watery blood in the heart. Chemical analysis confirmed brodifacoum residues in the liver at 0.82 ppm. No other anticoagulants detected.
I012969-001	2001	Undetermined	Probable	CA	Urban	Hawk (1)	A red-tailed hawk that habitually perched in a bridge treated for control of pigeons with Avitrol® was found dead. An exam showed the bird was emaciated and had not consumed anything for some time. No residue analysis to confirm.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I012969-005	2001	Undetermined	Highly probable	CA	N/R	Owl (2), Hawk (1)	This incident was reported as part of the California Department of Fish and Game incident reports for 2001 which concerned two great horned owls and one Cooper's hawk. Brodifacoum was considered to be the cause of death although no confirmatory residue analysis was included in the incident report.
I012970-007	2000	Undetermined	Highly probable	CA	N/R	Coyote (1)	This incident was reported as part of the California Department of Fish and Game incident reports in which a coyote was found dead. The anticoagulants brodifacoum and bromadiolone were considered to be the cause of death although no confirmatory residue analysis was included in the incident report.
I01310-010	1995	Undetermined	Probable	NY	N/R	Deer (1)	This incident is part of the New York Department of Environmental Conservation Contaminant Exposure and Effects Database Report from 2002. A white-tailed deer was found to have brodifacoum residues of 0.37 ppm and racumin residues at 0.5 ppm in its liver.
I013117-001	2002	Undetermined	Highly probable	NY	Residential	Crow (1)	An American Crow was found in the side yard of the property owner and submitted for pathology. Clotted blood was present in the lumen. The liver contained 1.73 ppm of brodifacoum. No other anticoagulants detected.
I013182-001	2002	Registered use	Highly probable	CA	Island	10 species of migratory birds	Brodifacoum had been distributed by federal agencies for use on Anacapa Island to kill invasive black rats. An unintended consequence was the secondary poisoning of migratory birds of at least 10 species. There was no confirmatory chemical residue analysis included in the report.
I013182-001	2002	Registered use	Highly probable	CA	Island	10 species of migratory birds	Brodifacoum had been distributed by federal agencies for use on Anacapa Island to kill invasive black rats. An unintended consequence was the secondary poisoning of migratory birds of at least 10 species. There was no confirmatory chemical residue analysis included in the report.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I013245-001	2001	Undetermined	Possible	CA	Field	Bobcat (1)	A bobcat that was part of a radio-telemetry study being conducted by the National Park Service was recovered in the vicinity of the Santa Monica Mountains National Recreation Area. Blood was present in the nose and mouth. A sub-cutaneous hematoma was observed on the upper inside of the left front leg. There was a penetrating hole in the skull above the foramen magnum that passed into the brain case and significant bruising around the base of the skull. The abdominal cavity contained significant amounts of free blood. The stomach contained remains that were mammalian in origin. An analysis of the liver detected brodifacoum at 0.024 ppm. The ultimate determination was the bobcat was hit by a vehicle although exposure to brodifacoum was also evident.
I013622-001	2002	Undetermined	Probable	NY	Residential	Hawk (1)	A Cooper's hawk was found dead and had extensive hemorrhaging over the ventral abdomen and down the left leg. The intestines were stained with blood. Brodifacoum was the only anticoagulant found which had residues of 0.37 ppm in the liver.
I013798-039	1996	Undetermined	Probable	NY	N/R	Hawk (1)	A Red-Tailed Hawk was identified as having brodifacoum residues of 0.5 ppm in the liver. This incident was reported in the Journal of Wildlife Diseases, April, 1999, Vol. 35, No.2.
I013798-043	1997	Undetermined	Probable	NY	N/R	Crow (1)	A Common Crow was found dead and having 1.34 ppm brodifacoum in the liver. This incident was reported in the Journal of Wildlife Diseases, April, 1999, Vol. 35, No.2.
I013798-052	1997	Undetermined	Probable	NY	N/R	Deer (1)	A White-Tailed Deer was found dead with brodifacoum residues at 0.16 ppm in its liver. This incident was reported in the Journal of Wildlife Diseases, April, 1999, Vol. 35, No.2.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I013810-001	1994	Undetermined	Probable	NY	N/R	Deer (1)	This incident is part of the New York Department of Environmental Conservation Contaminant Exposure and Effects Database Report from 2002. A white-tailed deer was found to have brodifacoum residues of 0.38 ppm in its liver.
I013810-015	1996	Undetermined	Probable	NY	N/R	Deer (1)	This incident is part of the New York Department of Environmental Conservation Contaminant Exposure and Effects Database Report from 2002. A white-tailed deer was found to have brodifacoum residues of 0.12 ppm in its liver.
I014694-001	2000	Undetermined	Probable	CA	N/R	Hawk (1)	A red-tailed hawk was found dead and sent to a pesticide laboratory unit for necropsy and tissue analysis. The liver contained brodifacoum residues at 0.12 ppm
I014717-001	2003	Undetermined	Probable	GA	State Park	Hawk (1), Owl (1)	A red-tailed hawk was found to be lethargic and was rehydrated with an improved appetite yet died 6 days later. The barn owl was found to be lethargic with fluffed feathers and was found dead upon arrival at a care facility. The crop in the hawk had a moderate amount of white fur. Extensive hemorrhaging in both birds was found and brodifacoum residues were present in the liver (7 ppb in the hawk and 77 ppb in the owl). There was no known use of brodifacoum to control rodents in the park.
I014841-001	2002	Undetermined	Probable	NY	Residential	Vulture (1)	A black vulture was found dead with hemorrhaging present in the vicinity of the kidneys and in both lungs. The crop contained some unidentified flesh, fat, and bone, and some white tailed deer hair was noted in the stomach. Chemical analysis showed brodifacoum residues at 0.13 ppm in the liver. No other anticoagulants detected.
I014843-001	2002	Undetermined	Highly probable	NY	N/R	Hawk (1)	A red-shouldered hawk was found dead and collected for examination. An analysis of the liver detected brodifacoum residues at 0.23 ppm.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I014843-001	2002	Undetermined	Probable	NY	Residential	Hawk (1)	A red-shouldered hawk was found dead with a large volume of semi-clotted blood present in the body cavity. An analysis showed 0.23 ppm brodifacoum present in the liver. No other anticoagulants detected.
I014884-001	2002	Undetermined	Possible	CA	N/R	Fox (1)	This incident was reported with the California Department of Fish and Game report of incidents for calendar years 2002 and 2003. A San Joaquin kit fox was analyzed and one was found to have brodifacoum in its system although there is no concentration of residue provided in the report.
I014884-002	2002	Undetermined	Possible	CA	N/R	Fox (2)	These incidents were reported with the California Department of Fish and Game report of incidents for calendar years 2002 and 2003. Two San Joaquin kit foxes were analyzed and one was found to have brodifacoum in its system although there is no concentration of residue provided in the report.
I014884-012	2002	Undetermined	Probable	CA	N/R	Owl (1)	This incident was included in the California Department of Fish and Game report of fish and wildlife incidents involving pesticides for calendar years 2002 and 2003. A barn owl was identified as having brodifacoum residues in its system although no confirmatory residue analysis was provided.
I014886-001	2003	Undetermined	Highly probable	CA	N/R	Pigeon (1)	A rock pigeon was found dead and collected for examination. There was no confirmatory residue analysis included in the incident report and it was determined rodenticide poisoning from diphacinone and brodifacoum was the cause of the pigeon's death.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I014887-001	2002	Undetermined	Highly probable	CA	Residential	Owl (1)	An adult female Barn Owl was recovered from the yard of a residence in Sacramento by the property owner. The bird had a mate and had been observed roosting at the residence for a period of time before the recovery. There was a massive subcutaneous hemorrhage on the left ventral portion of the keel. The ventriculus contained a few unidentified mammal hairs. Analysis confirmed brodifacoum residues at 0.03 ppm in liver.
I014891-001	2002	Undetermined	Highly probable	NY	N/R	Vulture (1)	A black vulture was found dead and collected for examination. An analysis of the liver detected brodifacoum residues at 0.13 ppm.
I014892-001	2002	Undetermined	Probable	NY	Residential	Owl (1)	An Eastern Screech Owl was found dead in the backyard of a home with hemorrhaging present in the left leg and brodifacoum residues at 0.6 ppm detected in the liver. The stomach contained some unidentified insect fragments and hair. No other anticoagulants detected.
I014894-001	2002	Undetermined	Highly probable	NY	Residential	Hawk (1)	A red-tailed hawk was found on the ground at a residence and turned over to Volunteers for Wildlife. The bird died the same day it was submitted with hemorrhaging present in the caudoventral abdomen. The stomach contained a trace of unidentified hair. Brodifacoum residues were detected at 0.57 ppm in the liver. No other anticoagulants detected.
I015034-001	2002	Undetermined	Highly probable	NY	Field	Hawk (1)	A red-tailed hawk was found dead east of a farm and later submitted for necropsy. Blood was present in the mouth, nares, and lumen of the trachea. Hemorrhaging was present over the right lateral abdomen and in the lungs. The stomach contained a small wad of unidentified hair and the intestine contents were dark colored. Liver analysis showed brodifacoum residues at 0.4 ppm. No other anticoagulants detected.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I015035-001	2002	Undetermined	Highly Probable	NY	Field	Owl (1)	An adult female Great Horned Owl was found dead with brodifacoum residues detected in the liver at 0.44 ppm. There were large areas of subcutaneous hemorrhage present over much of the right leg and smaller areas present along the right ventrolateral neck and ventral left pectoral muscle. No other anticoagulants detected.
I015048-001	2003	Undetermined	Highly probable	NY	Residential	Owl (1)	An adult Eastern Screech Owl was found on the ground, un-alert, and unable to stand. The bird died the next day with liver concentrations of brodifacoum detected at 0.3 ppm. There was extensive subcutaneous hemorrhage over the left leg and unidentified small mammal hair and bones in the stomach. No other anticoagulants detected.
I015049-001	2004	Undetermined	Highly probable	NY	Residential	Hawk (1)	An adult red-tailed hawk was found dead with brodifacoum residues detected at 0.5 ppm in the liver. Hemorrhaging found around left hip and lower right leg. The crop contained one freshly ingested short tailed shrew. No other anticoagulants detected.
I015050-001	2003	Undetermined	Highly probable	NY	Field	Hawk (1)	An adult female Cooper's Hawk was found dead with brodifacoum liver concentrations at 0.28 ppm. Hemorrhaging detected over right medial thigh. No other anticoagulants detected.
I015051-001	2002	Undetermined	Probable	NY	Residential	Owl (1)	An adult male great horned owl was observed in a lethargic state three days before its death. There was a small area of hemorrhage in the lower left pectoral muscle. Brodifacoum was detected at 0.026 ppm in the liver. Internal hemorrhaging noted and no other anticoagulants detected.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I015090-001	2004	Undetermined	Probable	NY	Residential	Kestrel / Falcon (1)	Hemorrhage extended over the ventral breast and down the subcutaneous tissues of the right leg. The stomach contained a small amount of sand-like grit. A few of these small granules were present in the small intestine. Brodifacoum residues found at 0.29 ppm in liver of one adult kestrel. No other anticoagulants found in analysis.
I015326-005	2001	Undetermined	Probable	NY	N/R	Squirrel (8)	These incidents were from the USGS Report of the National Wildlife Health Center dated in 2001 that stated 8 grey squirrels were killed by brodifacoum exposure. No confirmatory chemical residue analysis was included with the report.
I015466-001	2004	Undetermined	Highly probable	NY	Residential	Owl (1)	An Eastern Screech Owl was found dead in a residential area and collected for examination. An analysis of the liver detected brodifacoum residues at 0.63 ppm.
I015731-001	2003	Undetermined	Probable	NY	Residential	Squirrel (1)	A dead squirrel was found in a residential area and submitted to a wildlife pathology unit. Subcutaneous hemorrhage was present around the left foreleg and over the dorsal pelvis. The thorax was filled with unclotted blood. The stomach contained a small volume of tan-green material. Analysis of the liver showed brodifacoum residues of 0.81 ppm. No other anticoagulants detected.
I015734-001	2004	Undetermined	Probable	NY	Field	Owl (1)	A screech owl was found dead in a barn and a hemorrhage was noted over the left side of the thorax and lateral aspect of the left thigh. Hemorrhage was also present in the left lung. An analysis of the liver detected brodifacoum at 0.037 ppm. No other anticoagulants detected.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I015736-001	2004	Undetermined	Probable	NY	Residential	Crow (1)	A crow reportedly fell out of a tree at a residential address and was subsequently euthanized. A necropsy showed blood was in the mouth and poor clotted blood was present in the body cavity. The lungs were extremely congested with blood. An analysis of the liver detected brodifacoum residues at 0.17 ppm. No other anticoagulants detected.
I015737-001	2003	Undetermined	Possible	NY	Residential	Hawk (1)	A red-tailed hawk was found dead in a residential area. Necropsy showed a hemorrhage in both lungs. The stomach contained half of a red-bellied snake and some unidentified hair. Chemical residue analysis detected brodifacoum levels at 0.01 ppm in the liver. No other anticoagulants detected.
I015738-001	2003	Undetermined	Probable	NY	Residential	Hawk (1)	A red-tailed hawk was found dead at a residential address. Necropsy showed a massive subcutaneous hemorrhage over the dorsal and left lateral aspects of the thorax. Chemical residue analysis showed brodifacoum residues at 0.65 ppm in the liver. No other anticoagulants detected.
I015739-001	2003	Undetermined	Possible	NY	Residential	Owl (1)	A long-eared owl was found in a residential area by an urban park ranger in Manhattan. Small areas of subcutaneous hemorrhage were found over the left dorsal aspect of the synsacrum and the right occipital aspect of the skull. Hemorrhaging was also noted in the right lung. Liver analysis showed brodifacoum residues at 0.02 ppm in the liver. No other anticoagulants detected.
I015740-001	2003	Undetermined	Probable	NY	Residential	Owl (1)	An Eastern Screech Owl was found dead at a residential address. The subcutaneous tissues over the ventral abdomen and left leg were hemorrhagic. The stomach contained a small wad of small mammal hair. An analysis of the liver detected brodifacoum residues of 0.74 ppm. No other anticoagulants detected.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I015741-001	2004	Undetermined	Probable	NY	Residential	Hawk (1)	A red-tailed hawk was found dead and submitted to Westchester County Department of Health. The stomach contained hair, bone, and claws of gray squirrel origin. Liver analysis showed detected brodifacoum residues of 0.07 ppm. No other anticoagulants detected.
I015742-001	2004	Undetermined	Probable	NY	Residential	Squirrel (1)	The New York State Department of Environmental Conservation reported the case of a grey squirrel that was found dead on a road in a residential area. It died within an hour and was the third squirrel found dead in a 3 week period. The stomach contained a small volume of brown and white matter of unknown origin. Its lungs were filled with blood and brodifacoum was detected in the liver at 1.95 ppm. No other anticoagulants detected.
I015743-001	2003	Undetermined	Probable	NY	Residential	Hawk (1)	A red-tailed hawk was found dead in a residential area. Extensive subcutaneous hemorrhage was present over the scapulae, left breast, ventral abdomen, and along the lower right leg. An analysis of the liver detected brodifacoum residues at 0.29 ppm. No other anticoagulants detected.
I015744-001	2003	Undetermined	Probable	NY	Field	Owl (1)	An Eastern Screech Owl was found dead in a barn in an agricultural area. The stomach contained a dark paste tinged with blood and/or bile. Analysis of the liver detected brodifacoum residues at 0.035 ppm. No other anticoagulants detected.
I015962-001	2005	Undetermined	Probable	NY	Residential	Fox (1)	A juvenile red fox was found dead in a residential area and submitted to a wildlife pathology unit. The lungs were found to be hemorrhagic and the stomach contained hair, soil, maggots, half of a meadow vole, and the tongue from a small cat. Analysis of the liver detected brodifacoum residues of 0.34 ppm. No other anticoagulants detected.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I015966-001	2004	Undetermined	Probable	NY	Residential	Owl (1)	A Screech Owl was found dead in a residential area. An analysis of the liver detected brodifacoum residues at 0.63 ppm. No other anticoagulants detected.
I015983-001	2002	Undetermined	Possible	NY	Residential	Hawk (1)	A Cooper's Hawk was found dead in a residential area and submitted for necropsy. Hemorrhage was present in the sternal musculature, coelomic cavity and in the calvarium. An analysis of the liver detected brodifacoum residues at 0.02 ppm. No other anticoagulants detected.
I015989-001	2003	Undetermined	Probable	NY	Urban	Hawk (1)	A Cooper's Hawk was found dead in the Bronx Botanical Garden and submitted to a wildlife pathology unit. The gizzard was empty but contained bloody mucus. An analysis of the liver detected brodifacoum residues at 0.02 ppm. No other anticoagulants detected.
I016044-001	2005	Undetermined	Probable	NY	Residential	Opossum (1)	An adult opossum was found dead in a residential area and received by a wildlife pathology unit two days later. Subcutaneous hemorrhage was present over the ventral thorax and abdomen. There was a large amount of bloody fluid in the thorax and the lungs were hemorrhagic. The stomach contained pet kibble and water. An analysis of the liver detected brodifacoum residues at 0.16 ppm.
I016047-001	2003	Undetermined	Probable	NY	Residential	Opossum (1)	An adult opossum was found dead in a residential area. Extensive subcutaneous hemorrhagic edema was present over the left ventrolateral aspect of the abdomen. The heart blood was partially clotted and the stomach contained a small amount of opossum hair. Liver analysis detected brodifacoum residues at 0.03 ppm. No other anticoagulants detected.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I016049-001	2002	Undetermined	Probable	NY	Urban	Squirrel (1)	A grey squirrel was found dead in an urban area and necropsied the same day. Subcutaneous and intermuscular hemorrhages surrounded the area of the left hip in the tibia, fibula, and the right forearm. The heart blood was partially clotted. The stomach contents appeared to be well chewed nut meats. An analysis of the liver detected brodifacoum residues of 1.94 ppm. No other anticoagulants detected.
I016051-001	2003	Undetermined	Probable	NY	Residential	Rabbit (1), Robin (2)	One cottontail rabbit and two juvenile robins were found dead in a residential area. Extensive subcutaneous hemorrhage was found over the hindquarters of the rabbit. Post-mortem evaluation of the two robins was complicated by decomposition and maggots. A tentative diagnosis of trauma was made. A liver analysis of the rabbit showed brodifacoum residues of 0.4 ppm. No other anticoagulants detected.
I016052-001	2005	Undetermined	Probable	NY	Residential	Hawk (1)	A red-tailed hawk was observed flying and building a nest with her mate and was found dead a day later under a tree. Necropsy showed extensive hemorrhage present over the ventral abdomen and caudal breast. Large clotted hemorrhages were present on either side of the heart and in the lower portion of the thoraco-abdominal cavity. The ventriculus contained a small volume of feathers and bile. An analysis of the liver detected brodifacoum residues of 0.15 ppm. No other anticoagulants detected.
I016054-001	2004	Undetermined	Probable	NY	Residential	Hawk (1)	A red-tailed hawk was found dead in a residential area and submitted to a wildlife pathology unit 4 days later. Blood was present in the mouth and the lungs were hemorrhagic. An analysis of the liver detected brodifacoum residues at .07 ppm. No other anticoagulants detected.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I016055-001	2004	Undetermined	Probable	NY	Residential	Hawk (1)	A red-tailed hawk was found dead in a residential area. Subcutaneous hemorrhage was present between the skin and musculature of the right cranial mid-tibiotarsus. A small volume of watery blood was present in the heart. The ventriculus contained a small wad of hair and bile. An analysis of the liver detected brodifacoum residues of 0.08 ppm. No other anticoagulants detected.
I016066-001	2004	Registered use	Highly probable	CA	Field	Mountain lion (2)	Two adult mountain lions were found in the Simi Hills area near Los Angeles. These animals were being radio-tracked by a National Park Survey. They were two of four mountain lions known to be in the area. Necropsy of the animals found severe hemorrhages in the thoracic, pericardial, and abdominal cavities of one of the lions. In one lion, bromadiolone and brodifacoum were measured in the liver at 1.27 and 0.57 ppm, respectively. In the second lion, bromadiolone and brodifacoum was measured in the live rat 0.51 and 0.31 ppm, respectively. Park Service officials suspect that the mountain lions ingested the poison by eating coyotes that had eaten poisoned rodents.
I016097-001	2004	Undetermined	Probable	NY	Residential	Owl (1)	A Great-Horned Owl was found dead in a residential area and received for necropsy a month later. Subcutaneous hemorrhage was present over the left ventral abdomen and a large volume of blood was present. The ventriculus contained a trace of feathers. Liver analysis detected brodifacoum residues at 0.22 ppm. No other anticoagulants detected.
I016100-001	1999 to 2003	Undetermined	Probable	CA	Residential	Fox (27)	A study conducted in California from 1999 to 2003 gave results on the prevalence of San Joaquin Kit fox deaths. Kit foxes were trapped with and then equipped with transponders by which their movements and ultimately their carcasses could be traced. Necropsies provided evidence of causes of deaths and it was found that brodifacoum residues were found in 27 of the cases.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I016103-001	1980	Registered use	Probable	PA	Zoo	Various avian species (16)	A pest management program began at the Philadelphia Zoo in 1980. Brodifacoum as the product Talon was tested at the Bird House of the zoo. Bait stations were monitored daily to insure Talon was not dragged out of bait stations where it would be available to birds. Within a month, a pair of avocets had died and within the next few weeks, 14 more birds of various species had died. Chemical analysis showed the presence of brodifacoum in all of the dead birds
I016645-001	2005	Undetermined	Highly probable	CA	N/R	Owl (1)	An owl was found dead and received by the California Animal Health and Food Safety Laboratory. Extensive focal chronic hemorrhage was present in the left breast muscle and thoracoabdominal cavity. An analysis of the liver detected brodifacoum residues at 0.01 ppm. No other anticoagulants that were part of the screen (warfarin, bromadiolone, chlorophacinone, diphacinone, and difethialone) were detected.
I017458-001	2005	Undetermined	Highly probable	NY	Residential	Hawk (1)	A Cooper's Hawk was found dead in a residential area and submitted for necropsy. Hemorrhages in the muscles and intestines were observed and an analysis of the liver detected brodifacoum residues of 1.16 ppm and bromadiolone residues of 2.1 ppm. No other anticoagulants detected.
I017459-001	2005	Undetermined	Highly Probable	NY	N/R	Hawk (1)	A broad-winged hawk was found dead and submitted to a wildlife pathology unit for necropsy. Blood was present in the mouth and esophagus and hemorrhage was present in the sternal musculature. There was little to no blood in the heart and little in the lungs. The gizzard contained insect fragments and one nematode. An analysis of the liver detected brodifacoum residues at 0.87 ppm.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I017460-001	2006	Undetermined	Highly probable	NY	N/R	Crow (1)	An American crow was found dead and submitted to the Wildlife Pathology Unit for necropsy. The crow had extensive hemorrhages and the presence of a turquoise colored material in the gizzard and intestines indicating anticoagulant pesticide poisoning. An analysis of the liver detected brodifacoum residues at 0.47 ppm.
I017522-001	2005	Undetermined	Highly probable	NY	Residential	Hawk (1)	A broad-winged hawk was found dead in a residential area and submitted for necropsy. Hemorrhaging was present and analysis of the liver detected brodifacoum at 1.02 ppm. No other anticoagulants detected.
I021229-002	2009	Undetermined	N/R	KS	Park	Raccoon (1)	The Department of Wildlife and Parks received numerous reports of dead raccoon at a city park. The raccoon was delivered to the Southeastern Cooperative Wildlife Disease Study College of Veterinary Medicine (SCWDS) for postmortem analysis. The intestines of the raccoon were distended with bloody contents. Several areas of hemorrhage were present under the skin and on the surface of many organs. Brodifacoum, chlorophacinone, and bromadiolone residues were detected in the liver although no residue amounts were provided in the report.
I022935-003	2010	Undetermined	Probable	CA	Military base	Turkey vulture (1)	The California National Guard contacted the Department of Fish and Game Pesticides Investigations Unit to determine if diaphacinone used in a ground squirrel control program was responsible for the death of a turkey vulture. There was pooled blood in the left wing joint and an analysis of the liver contained 0.30 ppm brodifacoum and 0.50 ppm diaphacinone. It was determined the death of the bird more likely resulted from the brodifacoum than the diaphacinone.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I022943-001	2011	Undetermined	Probable	NY	Urban	Hawk (1)	A red-tailed hawk collected from Riverside Park, Manhattan was delivered to the Wildlife Pathology Unit. The lungs showed some grey-green discoloration and the liver was slightly pale. There was very little blood in the heart and elsewhere with the exception of a small clot in the jugular vein. The stomach contained the fur, bones, and skull of a Norway rat. An analysis of the liver detected brodifacoum at 0.22 ppm with difethialone and bromadiolone reported in trace amounts.
I022978-001	2010	Undetermined	Probable	MA	Urban	Hawk (1)	This incident was reported in Murray (2011) as part of a compilation of brodifacoum incidents occurring in central Massachusetts between April 2006 and March 2010. A red-tailed hawk was found down in an urban area. The bird was found not standing and died soon after admission to a wildlife clinic. There was extensive acute pulmonary hemorrhage present as well as bruising of the sternum and paleness of the liver. An analysis of the liver detected brodifacoum residues of 0.046 ppm.
I022978-002	2010	Undetermined	Highly Probable	MA	Urban	Hawk (1)	This incident was reported in Murray (2011) as part of a compilation of brodifacoum incidents occurring in central Massachusetts between April 2006 and March 2010. A red-tailed hawk was found down in an urban area. The bird was found not standing with extensive subcutaneous intramuscular bruising on both legs and died soon after admission to a wildlife clinic. There was extensive acute hemorrhage of the adipose tissue and acute intracoelomic hemorrhage. There was bruising of the sternum and the internal organs appeared pale. An analysis of the liver detected brodifacoum residues of 0.077 ppm.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I022978-003	2010	Undetermined	Highly probable	MA	Urban	Hawk (1)	This incident was reported in Murray (2011) as part of a compilation of brodifacoum incidents occurring in central Massachusetts between April 2006 and March 2010. A red-tailed hawk was observed in an urban area depressed and not moving. It was later presented dead at a wildlife clinic. There was multifocal, severe, acute pulmonary and mesenteric hemorrhaging present as well as extensive intracoelomic hemorrhage and paleness of internal organs. An analysis of the liver detected brodifacoum residues of 0.27 ppm.
I022978-004	2010	Undetermined	Highly probable	MA	Urban	Hawk (1)	This incident was reported in Murray (2011) as part of a compilation of brodifacoum incidents occurring in central Massachusetts between April 2006 and March 2010. A red-tailed hawk was observed in an urban area depressed and not moving for over 6 hours. There was blood observed around the glottis and extensive bruising was present in the right axillary area, the sternum, within the ventricular serosa, and over the coelom. Also observed was multifocal, marked acute pulmonary and mesenteric hemorrhage. An analysis of the liver detected brodifacoum residues at 0.15 ppm.
I022978-005	2010	Undetermined	Highly probable	MA	Residential	Hawk (1)	This incident was reported in Murray (2011) as part of a compilation of brodifacoum incidents occurring in central Massachusetts between April 2006 and March 2010. A red-tailed hawk was found down in a residential area. The bird was depressed, not standing, and bleeding from the glottis and choana. A wound found on the neck had hemorrhaging present and the bird died soon after admission to a wildlife clinic. The pectoral muscle was pale and intracoelomic hemorrhaging was present. An analysis of the liver detected brodifacoum residues at 0.21 ppm.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I022978-006	2010	Undetermined	Highly Probable	MA	Field	Owl (1)	This incident was reported in Murray (2011) as part of a compilation of brodifacoum incidents occurring in central Massachusetts between April 2006 and March 2010. A barred owl was found dead on a farm along with multiple dead birds of various species. It was presented dead to a wildlife clinic. There was extensive subcutaneous hemorrhaging present as well as bruising of the sternum and a paleness of the liver. An analysis of the liver detected brodifacoum residues at 0.16 ppm.
I022978-007	2010	Undetermined	Highly Probable	MA	Residential	Owl (1)	This incident was reported in Murray (2011) as part of a compilation of brodifacoum incidents occurring in central Massachusetts between April 2006 and March 2010. A barred owl was found down in a residential area. It died shortly after admission to a wildlife clinic. There was intracoelomic hemorrhaging present as well as a paleness of the internal organs and lesions on the liver. An analysis of the liver detected brodifacoum residues at 0.06 ppm.
I022978-008	2010	Undetermined	Probable	MA	N/R	Owl (1)	This incident was reported in Murray (2011) as part of a compilation of brodifacoum incidents occurring in central Massachusetts between April 2006 and March 2010. An eastern screech owl was brought to a clinic after it was observed to fly into a window. Extensive bruising of the pectoral was present upon admission to a wildlife clinic where it died soon afterward. There was extensive subcutaneous and pectoral muscle hemorrhage and a paleness of the liver. Marked acute pulmonary hemorrhage and edema was also present. An analysis of the liver detected brodifacoum residues of 0.14 ppm.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I022978-009	2010	Undetermined	Possible	MA	Field	Owl (1)	This incident was reported in Murray (2011) as part of a compilation of brodifacoum incidents occurring in central Massachusetts between April 2006 and March 2010. A great horned owl was observed in the wild perched in the same tree for two days, depressed and not moving. The bird was later presented dead to a wildlife clinic. There was extensive subcutaneous and intramuscular hemorrhage as well as acute, moderate to marked epimyocardial hemorrhage and paleness of internal organs. An analysis of the liver detected brodifacoum residues at 0.012 ppm.
I022968-001	2011	Undetermined	Highly probable	NY	Urban	Red-tailed hawk (1)	A dead immature red-tailed hawk was found in Fort Tryon Park in Manhattan, NY. A clotted hemorrhage was observed in the left optical area of the left side of the head. There was 1-2 ml of clotted hemorrhage found in the ceolomec cavity. Toxicology analysis of liver tissue found brodifacoum at 0.149 ppm. Low concentrations of three other anticoagulant rodenticides were also detected 0.024 ppm difethialone, 0.018 ppm bromadiolone, and 0.004 ppm chlorophacinone.)
I023172-001	2011	Undetermined	Highly probable	CA	Urban	Barn owl (1)	An incapacitated barn owl chick was found on the sidewalk in Antioch, CA. The owl was transported to a wildlife museum and treated antibiotics, fluids, and Vitamin K, but it died the next day. A necropsy found extensive bleeding on the wings and back. Toxicology analysis of liver tissue found brodifacoum at 0.169 ppm and a small amount of diphacinone at 0.002 ppm.
I023151-001	2011	Undetermined	Probable	CA	Urban	Cooper's hawk (1)	A Cooper's hawk was found dead in a pool of blood on a sidewalk in Berkeley, CA. Toxicology testing detected brodifacoum and a trace amount of diphacinone.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
R000-02-006	1997	Undetermined	Probable	CA	N/R	Eagle (1)	A golden eagle was found dead and it was the judgment of the wildlife pathology that brodifacoum exposure was the cause of death. An analysis of the liver detected brodifacoum residues at 0.08 ppm.
R000-02-007	1998	N/R	Possible	CA	Field	Coyote (1)	This incident is among those in a table entitled "California Wildlife Submitted for Anticoagulant residue Analysis Between 1994 – 2000." A coyote was trapped and euthanized and an analysis of its liver detected brodifacoum residues of 0.08 ppm, diphacinone residues at 0.081 ppm, and chlorophacinone residues at 0.43 pm. Pesticides were not determined to be the cause of death since the animal was euthanized.
R000-02-012	1998	N/R	Possible	CA	Field	Coyote (1)	This incident is among those in a table entitled "California Wildlife Submitted for Anticoagulant residue Analysis Between 1994 – 2000." A coyote was found dead and an analysis of its liver detected brodifacoum residues of 0.04 ppm.
R000-02-014	1998	N/R	Probable	CA	Field	Fox (1)	This incident is among those in a table entitled "California Wildlife Submitted for Anticoagulant residue Analysis Between 1994 – 2000." A grey fox was found dead and an analysis of its liver detected brodifacoum residues of 0.03 ppm.
R000-02-025	1999	N/R	Possible	CA	N/R	Eagle (1)	This incident is among those in a table entitled "California Wildlife Submitted for Anticoagulant residue Analysis Between 1994 – 2000." A golden eagle was found dead after which an analysis of its liver detected brodifacoum residues of 0.04 ppm.
R000-02-026	1999	N/R	Possible	CA	N/R	Eagle (1)	This incident is among those in a table entitled "California Wildlife Submitted for Anticoagulant residue Analysis Between 1994 – 2000." A golden eagle was found dead after which an analysis of its liver detected brodifacoum residues of 0.04 ppm.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
R000-02-030	1999	N/R	Unlikely	CA	Field	Fox (1)	This incident is among those in a table entitled "California Wildlife Submitted for Anticoagulant residue Analysis Between 1994 – 2000." A San Joaquin kit fox was found dead after which an analysis of its liver detected brodifacoum residues of 0.01 ppm and chlorophacinone residues of 0.27 ppm. Though the rodenticide concentrations were appreciable, the pathologist's judgment was that it was not likely to be the cause of the fox's death.
R000-02-033	1999	N/R	Highly probable	CA	N/R	Owl (1)	This incident is among those in a table entitled "California Wildlife Submitted for Anticoagulant residue Analysis Between 1994 – 2000." A great horned owl was found dead after which an analysis of its liver detected brodifacoum residues of 0.35 ppm and bromodialone residues of 0.065 ppm.
R000-02-033	1999	N/R	Highly probable	CA	N/R	Owl (1)	This incident is among those in a table entitled "California Wildlife Submitted for Anticoagulant residue Analysis Between 1994 – 2000." A great horned owl was found dead after which an analysis of its liver detected brodifacoum residues of 0.35 ppm and bromodialone residues of 0.065 ppm.
R000-02-034	1999	N/R	Highly probable	CA	N/R	Owl (1)	This incident is among those in a table entitled "California Wildlife Submitted for Anticoagulant residue Analysis Between 1994 – 2000." A barn owl was found dead after which an analysis of its liver detected brodifacoum residues of 0.21 ppm and bromodialone residues of 0.38 ppm.
R000-02-035	1999	N/R	Highly probable	CA	N/R	Owl (1)	This incident is among those in a table entitled "California Wildlife Submitted for Anticoagulant residue Analysis Between 1994 – 2000." A barn owl was found dead after which an analysis of its liver detected brodifacoum residues of 0.35 ppm.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
R000-02-036	1999	N/R	Highly probable	CA	N/R	Owl (1)	This incident is among those in a table entitled "California Wildlife Submitted for Anticoagulant residue Analysis Between 1994 – 2000." A barn owl was found dead after which an analysis of its liver detected brodifacoum residues of 0.07 ppm and bromodialone residues of 0.31 ppm.
R000-02-041	1999	N/R	Possible	CA	Field	Fox (1)	This incident is among those in a table entitled "California Wildlife Submitted for Anticoagulant residue Analysis Between 1994 – 2000." A San Joaquin kit fox was found dead after which an analysis of its liver detected brodifacoum residues of 0.67 ppm. The pathologist did not make a judgment concerning the certainty but the appreciable concentrations of brodifacoum can be considered a possible cause of death.
R000-02-045	2000	N/R	Highly probable	CA	Field	Coyote (1)	This incident is among those in a table entitled "California Wildlife Submitted for Anticoagulant residue Analysis Between 1994 – 2000." A coyote was found dead after which an analysis of its liver detected brodifacoum residues of 0.08 ppm and bromodialone residues at 0.44 ppm.
R000-02-046	2000	N/R	Possible	CA	Field	Fox (1)	This incident is among those in a table entitled "California Wildlife Submitted for Anticoagulant residue Analysis Between 1994 – 2000." A San Joaquin kit was found dead after which an analysis of its liver detected brodifacoum residues of 1.0 ppm. The pathologist report did not specify a degree of certainty for this incident but 1 ppm brodifacoum could be considered a substantial concentration.
R000-02-047	2000	N/R	Possible	CA	Field	Fox (1)	This incident is among those in a table entitled "California Wildlife Submitted for Anticoagulant residue Analysis Between 1994 – 2000." A San Joaquin kit was found dead after which an analysis of its liver detected brodifacoum residues of 0.11 ppm. The pathologist report did not specify a degree of certainty for this incident but 0.11 ppm could have possibly played a role in

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
							this incident
R000-02-048	2000	N/R	Possible	CA	Field	Fox (1)	This incident is among those in a table entitled "California Wildlife Submitted for Anticoagulant residue Analysis Between 1994 – 2000." A San Joaquin kit was found dead after which an analysis of its liver detected brodifacoum residues of 0.1 ppm. The pathologist report did not specify a degree of certainty for this incident but 0.1 ppm could be a factor in the death of this animal
R000-02-049	2000	N/R	Highly probable	CA	N/R	Owl (1)	This incident is among those in a table entitled "California Wildlife Submitted for Anticoagulant residue Analysis Between 1994 – 2000." A Great Horned owl found dead after which an analysis of its liver detected brodifacoum residues of 0.34 ppm.
R000-02-052	2000	N/R	Unlikely	CA	Field	Fox (1)	This incident is among those in a table entitled "California Wildlife Submitted for Anticoagulant residue Analysis Between 1994 – 2000." A San Joaquin kit fox was found dead after which an analysis of its liver detected brodifacoum residues of 0.13 ppm and bromodialone residues of 0.14 ppm. Though the rodenticide concentrations were appreciable, the pathologist's judgment was that it was not likely to be the cause of the fox's death.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
R000-02-055	1989	N/R	Unlikely	NY	N/R	Owl (1)	This is one of the incidents in Table 1 of Journal of Wildlife Diseases (Vol. 35, 1999) By Stone et al, in an article entitled, "Poisoning of Wildlife with Anticoagulants." A Great Horned Owl was found dead after which an analysis of its liver detected brodifacoum residues of 0.13 ppm and bromodialone residues of 0.1 ppm. The incident reviewer determined that brodifacoum was not responsible for the owl's death.
R000-02-056	1990	N/R	Probable	NY	Residential	Squirrel (1)	This is one of the incidents in Table 1 of Journal of Wildlife Diseases (Vol. 35, 1999) By Stone et al, in an article entitled, "Poisoning of Wildlife with Anticoagulants." A grey squirrel was found dead after which an analysis of its liver detected brodifacoum residues of 0.07 ppm. There was free hemorrhage or bloody fluid in the body cavity. The incident reviewer determined that brodifacoum was the probable cause for the squirrel's death.
R000-02-057	1990	N/R	Highly probable	NY	Residential	Squirrel (1)	This is one of the incidents in Table 1 of Journal of Wildlife Diseases (Vol. 35, 1999) By Stone et al, in an article entitled, "Poisoning of Wildlife with Anticoagulants." A grey squirrel was found dead after which an analysis of its liver detected brodifacoum residues of 4.1 ppm. There was intrauterine hemorrhage present. The incident reviewer determined that brodifacoum was highly probable for the cause of squirrel's death.
R000-02-058	1992	N/R	Highly probable	NY	Field	Chipmunk (1)	This is one of the incidents in Table 1 of Journal of Wildlife Diseases (Vol. 35, 1999) By Stone et al, in an article entitled, "Poisoning of Wildlife with Anticoagulants." A chipmunk was found dead after which an analysis of its liver detected brodifacoum residues of 3.8 ppm. The incident reviewer determined that brodifacoum was highly probable for the cause of squirrel's death.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
R000-02-059	1992	N/R	Highly probable	NY	Field	Raccoon (1)	This is one of the incidents in Table 1 of Journal of Wildlife Diseases (Vol. 35, 1999) By Stone et al, in an article entitled, "Poisoning of Wildlife with Anticoagulants." A raccoon was found dead after which an analysis of its liver detected brodifacoum residues of 1.8 ppm. Dyed rodenticide bait was also present in its alimentary canal. The incident reviewer determined that brodifacoum was highly probable for the cause of squirrel's death.
R000-02-059	1992	N/R	Highly probable	NY	Field	Raccoon (1)	This is one of the incidents in Table 1 of Journal of Wildlife Diseases (Vol. 35, 1999) By Stone et al, in an article entitled, "Poisoning of Wildlife with Anticoagulants." A raccoon was found dead after which an analysis of its liver detected brodifacoum residues of 1.8 ppm. Dyed rodenticide bait was also present in its alimentary canal. The incident reviewer determined that brodifacoum was highly probable for the cause of squirrel's death.
R000-02-060	1992	N/R	Highly probable	NY	Field	Raccoon (3)	This is one of the incidents in Table 1 of Journal of Wildlife Diseases (Vol. 35, 1999) By Stone et al, in an article entitled, "Poisoning of Wildlife with Anticoagulants." Three raccoons were found dead after which an analysis of their livers detected brodifacoum residues of 3.1, 5.3, and 4.6 ppm. All had hemorrhaging present in the lungs.
R000-02-061	1993	N/R	Probable	NY	Residential	Squirrel (1)	This is one of the incidents in Table 1 of Journal of Wildlife Diseases (Vol. 35, 1999) By Stone et al, in an article entitled, "Poisoning of Wildlife with Anticoagulants." A grey squirrel were found dead after which an analysis of its liver detected brodifacoum residues of 0.53 ppm and chlorophacinone residues of 0.62 ppm. There were inter and intra muscular hemorrhages and free hemorrhage or bloody fluid in the body cavity. All had hemorrhaging present in the lungs.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
R000-02-062	1993	N/R	Probable	NY	Residential	Squirrel (1)	This is one of the incidents in Table 1 of Journal of Wildlife Diseases (Vol. 35, 1999) By Stone et al, in an article entitled, "Poisoning of Wildlife with Anticoagulants." A grey squirrel was found dead after which an analysis of residues detected brodifacoum at 25.8 ppm in the colon. There was subcutaneous hemorrhages inter and intra muscular hemorrhages and dyed rodenticide bait in the alimentary canal.
R000-02-063	1997	N/R	Probable	NY	N/R	Owl (1)	This is one of the incidents in Table 1 of Journal of Wildlife Diseases (Vol. 35, 1999) By Stone et al, in an article entitled, "Poisoning of Wildlife with Anticoagulants." A screech owl was found dead after which an analysis of its liver detected brodifacoum residues at 0.34 ppm. There was subcutaneous hemorrhage and a hemorrhage in the lungs. The incident reviewer determined that brodifacoum was probable for the cause of owl's death.
R000-02-064	1997	N/R	Possible	NY	N/R	Opossum (1)	This is one of the incidents in Table 1 of Journal of Wildlife Diseases (Vol. 35, 1999) By Stone et al, in an article entitled, "Poisoning of Wildlife with Anticoagulants." An opossum was found dead after which an analysis of its liver detected brodifacoum at 0.18 ppm.
R000-02-065	1997	N/R	Probable	NY	N/R	Owl (1)	This is one of the incidents in Table 1 of Journal of Wildlife Diseases (Vol. 35, 1999) By Stone et al, in an article entitled, "Poisoning of Wildlife with Anticoagulants." A screech owl was found dead after which an analysis of its liver detected brodifacoum residues at 0.80 ppm. There was inter and intra muscular hemorrhaging present. The incident reviewer determined that brodifacoum was probable for the cause of owl's death.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
R000-02-066	1997	N/R	Possible	NY	Field	Deer (1)	This is one of the incidents in Table 1 of Journal of Wildlife Diseases (Vol. 35, 1999) By Stone et al, in an article entitled, "Poisoning of Wildlife with Anticoagulants." A white-tailed deer was found dead after which an analysis of its liver detected brodifacoum residues at 0.16 ppm. There was hemorrhaging in the lungs and subcutaneous edema. The incident reviewer determined that brodifacoum was probable for the cause of owl's death.

Table D2. Wildlife Mortality Incidents Attributed to Use of Difethialone.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I018414-002	2007	N/R	Probable	CA	Urban	Hawk (1)	A red-shouldered hawk was found dead in San Francisco's Golden Gate Park after ingesting rats poisoned by difethialone that was used to control rodents in the park.
I018414-003	2007	N/R	Probable	CA	Urban	Hawk (1)	A red-tailed hawk was found dead in San Francisco's Golden Gate Park after ingesting rats poisoned by difethialone that was used to control rodents in the park.
I018414-004	2007	N/R	Probable	CA	Urban	Hawk (1)	A red-tailed hawk was found dead in San Francisco's Golden Gate Park after ingesting rats poisoned by difethialone that was used to control rodents in the park.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I018414-005	2007	N/R	Probable	CA	Urban	Fox (1)	A red fox was found dead in San Francisco's Golden Gate Park after ingesting rats poisoned by difethialone that was used to control rodents in the park.
I020713-002	2009	N/R	Possible	FL	Residential 1	Deer (1)	A key deer was found dead near a private residence and submitted for necropsy. There was a moderate amount of dark red to black fluid in the thoracic cavity. The lungs are dark red and edematous and the heart was flaccid and dark red with similar fluid to that seen in the thoracic cavity. An analysis of the liver detected brodifacoum residues at 1.3 ppm and trace amounts of difethialone. The final diagnosis was brodifacoum and difethialone poisoning.

Table D3. Wildlife Mortality Incidents Attributed to Use of Warfarin

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
CEE-TV # 61108	1998	N/R	Probable	NY	N/R	Cooper's Hawk (1)	Warfarin detected in liver at 0.73 ppm
I003350-001	1995	N/R	Probable	NY	Residential 1	Bald Eagle (1)	Warfarin detected in liver at 1.4 ppm. Second year male diagnosed with warfarin intoxication. Gross pathology-hemorrhage in alimentary canal.

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I004169-001	1981	Registered	Possible	VA	Agricultural	Bobwhite Quail (3)	Gross pathology found lesions in the birds consistent with warfarin poisoning; no analytical data were included in the report.
I006306-016	1986	N/R	Highly Probable	NJ	N/R	Peregrine Falcon (1)	Warfarin detected in the liver at 1.48 ppm
I008146-001	1998	Registered Use	Probable	NY	N/R	Great Horned Owl (1)	Warfarin detected in liver at 0.73 ppm
I011130-001	2000	N/R	Probable	GA	Agricultural	Bald Eagle (1)	Chemical residues were found in the gut contents, or bait material and biological or biochemical evidence
I013810-014	1971	N/R	Probable	NY	N/R	Squirrel (1)	--
R000-02-054	1981	N/R	Probable	NY	N/R	Squirrel (1)	Warfarin detected in the liver at 0.22 ppm. Gross pathology-pallor of muscle and/or internal organs, inter- and intramuscular hemorrhages, hemorrhage and/or serum in pericardial sac.

Table D4. Wildlife Mortality Incidents Attributed to Use of Diphacinone

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species (Number Affected)	Comments
I007488-004	1998	N/R	Highly probable	VA	Residential	Squirrel (2)	Two grey squirrels were found dead and collected by the Virginia Department of Game and Inland Fisheries. The stomach and small intestine of the first squirrel contained abundant unclotted blood mixed with a scant amount of tan granular material. The small intestine for the second squirrel contained a smaller amount of unclotted blood. The thoracic cavities of both squirrels were filled with unclotted blood. Liver analysis detected bromadiolone and diphacinone residues in pooled liver samples from both squirrels at 4.94 for bromadiolone and 3.41 ppm for diphacinone.
I005353-001	1997	N/R	Highly probable	NY	Residential	Squirrel (1)	A squirrel was found in the yard of a resident. Necropsy showed areas of subcutaneous edema and hemorrhage found over the ventral thorax and upper abdomen along with the right foreleg and on the right side of the head. The stomach contents were normal in appearance and odor. An analysis of the liver detected diphacinone residues at 2.0 ppm.
I006306-013	1998	N/R	Highly probable	NY	N/R	Owl (1)	A snowy owl was found dead and an analysis of its liver detected diphacinone residues. There were no residue numbers provided with the report.
R000-02-001	1994	N/R	Probable	CA	Field	Kangaroo rat (1)	This incident is among those in a table entitled, "California Wildlife Submitted for Anticoagulant Residue Analysis Between 1994 – 2000." A kangaroo rat was found in a moribund state. An analysis of the liver detected diphacinone residues at 3.5 ppm.
I007107-014	1997	N/R	Highly probable	CA	N/R	Coyote	This incident is one of the incidents reported in a consolidated incident report for the year 1997 by the California Department of Fish and Game. A coyote mortality was reportedly caused by brodifacoum and diphacinone poisoning as confirmed by the Pesticide Investigations Unit.

I019839-001	2008	N/R	Probable	GA	Residential	Squirrel (1)	A homeowner reported that approximately eight squirrels have been found dead in her yard and in the adjacent neighbor's yard. Diphacinone was detected in the liver of the squirrel at 3.6 ppm. Severe, acute, multifocal, subcutaneous, and intramuscular hemorrhaging was present.
B00640-001	1987	N/R	Probable	CA	Residential	Fox (1)	A San Joaquin kit fox was found dead at a nursery near a university where anticoagulant baits had been applied for ground squirrel control. Unclotted whole blood was present in the abdomen. Several diffuse areas of hemorrhages were present in the lungs. The stomach contained a few grass stems and some sand. The intestines were empty. Diphacinone residues at 0.18 ppm were detected by ELISA.
B000641-001	1986	N/R	Highly probable	CA	Field	Raccoon (1), Mountain Lion (1)	The California Department of Fish and Game reported this incident where a raccoon and mountain lion were found dead near a stream. Pooled free blood was found in the raccoon and in the mountain lion there were pinpoint and streaked hemorrhages in the small intestine and colon. Blood samples were analyzed and the results showed 55 ppm diphacinone in the raccoon and 45 ppm diphacinone in the mountain lion.
R000-01-001	1999	N/R	Unlikely	NY	Residential	Barred owl (1)	A barred owl was found dead in a residential area and submitted to the Wildlife Pathology Unit. The left tarsometarsus was fractured, and no hemorrhage was associated with it. This could have resulted because of a very rapid death due to severe head trauma. The stomach contained grasshopper legs. A analysis of the liver detected diphacinone residues at 0.62 ppm.
I009270-001	1999	N/R	Probable	NY	Residential	Hawk (1)	A red-tailed hawk was found moribund in a residential area. Small fish, appearing to be sardines were in the stomach. The bird was very anemic and lacked blood volume. An analysis of the liver detected diphacinone residues at 0.34 ppm.
I004769-001	1996	N/R	Highly probable	NY	Residential	Deer (1)	A white-tailed deer was found dead in a residential area with hemorrhages appearing like minor bruising and a hemorrhagic subcutaneous edema was found in the vicinity of the left shoulder and adjoining brisket area. The stomach was full of whole corn, vegetation, and water. An analysis of the liver detected diphacinone residues at 0.93 ppm.

I004768-001	1996	N/R	Highly probable	NY	N/R	Deer (1)	A white-tailed deer had been found dead and submitted to the Wildlife Pathology Unit. The presence of fairly large maggots in the carcass suggests this deer had been dead for several weeks. An analysis of the liver detected diphacinone residues at 0.2 ppm.
I001518-001	2000	N/R	Possible	NY	Residential	Squirrel (1)	A grey squirrel was found dead in a residential yard. There was a hemorrhage over the right orbit of the eye. The stomach contained a finely ground material. A small area of subcutaneous hemorrhage was present over the dorsal thorax. Blunt impact trauma was the immediate cause of death, but diphacinone residues detected at 1.02 ppm may have been contributing.
I014884-018	2003	N/R	Possible	CA	N/R	Pigeon (1)	The California Department of Fish and Game report of wildlife incidents involving pesticides for calendar years 2002 and 2003 identified an incident with a pigeon having diphacinone and brodifacoum levels detected in its tissues. No chemical residue values were provided.
I013810-006	1993	N/R	Probable	NY	N/R	Owl (1)	This incident is part of the Contaminant Exposure and Effects – Terrestrial Vertebrates (CEE-TV) Database, Version 3.3, October 2002 report. A snowy owl was found dead and its liver showed traces of diphacinone that were suspected as the cause of death.
I013810-008	2002	N/R	Probable	NY	N/R	Deer (1)	This incident is part of the Contaminant Exposure and Effects – Terrestrial Vertebrates (CEE-TV) Database, Version 3.3, October 2002 report. A white-tailed deer was found dead. Analysis showed that diphacinone was present at 0.93 ppm.
I013810-007	2002	N/R	Probable	NY	N/R	Deer (1)	This incident is part of the Contaminant Exposure and Effects – Terrestrial Vertebrates (CEE-TV) Database, Version 3.3, October 2002 report. A white-tailed deer was found dead. Analysis showed that diphacinone was present at 0.20 ppm.
I007107-007	1997	N/R	Possible	NY	N/R	Turkey vulture (1)	This incident is one of the incidents reported on the consolidated report for the year 1997 submitted by California Department of Fish and Game. After an analysis the Pesticide Investigation Unit determined the loss of the turkey vulture was due to diphacinone poisoning.

I007165-003	1997	N/R	Highly probable	CA	Field	Coyote (1)	The carcass of a young coyote was recovered from the Santa Monica Mountains national Recreation Area in thick riparian vegetation. Massive hematomas were observed on both of the hind legs. Free blood was present in the thoracic and abdominal cavities. The stomach contained a large ball of hair mixed with small pieces of bone. An analysis of the liver detected diphacinone residues at 1.3 ppm. Brodifacoum was also present at 0.083 ppm.
-------------	------	-----	-----------------	----	-------	------------	---

Table D5. Wildlife Mortality Incidents Attributed to Use of Chlorophacinone

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species and (Number Affected)	Comments
B000179-001	1981	Registered use	Highly probable	WA	Field	Quail (1)	This incident was reported in an article entitled, "Effects of Pelletized Anticoagulant Rodenticides on California Quail," in the Journal of Wildlife Diseases, 1985, pp391 – 395. A moribund emaciated California quail was found in an orchard. The rodenticide chlorophacinone was found in the crop, and the gizzard contained a pink mass of paraffin that was selectively accumulated from the paraffinized pellets.
R000-02-002	1994	N/R	Unlikely	CA	N/R	Turkey (1)	This incident is among those in a table entitled "California Wildlife Submitted for Anticoagulant Residue Analysis Between 1994 – 2000." This incident involves a turkey found dead and its blood was found to contain 5.5 ppm chlorophacinone. The chemical was not detected in the liver and it was the judgment of the pathologist that it was unlikely that chlorophacinone was the cause of death.
R000-02-003	1995	N/R	Probable	CA	N/R	Bobcat (1)	This incident is among those in a table entitled "California Wildlife Submitted for Anticoagulant Residue Analysis Between 1994 – 2000." This incident involves a bobcat found dead and a liver analysis detected chlorophacinone residues of 0.4 and in the pathologist's judgment was the cause of death
R000-02-005	1997	N/R	Highly Probable	CA	N/R	Coyote (1)	No further details were provided in the incident report.

I009063-001	1999	N/R	Possible	NY	Urban	Squirrel (1)	A grey squirrel was found dead in Central Park, Manhattan and later submitted to the Wildlife Pathology Unit. Several ribs were freshly fractured and had extensive associated hemorrhage. The stomach contained ground nutmeats. An analysis of the liver detected chlorophacinone residues at 0.44 ppm.
I009111-011	1999	N/R	Highly probable	NY	Urban	Squirrel (1)	A grey squirrel was found dead in Manhattan and arrived at the Wildlife Pathology Unit the same day. A hemorrhage was present in the musculature overlying both scapulae. The right lung was hemorrhagic. The stomach contained ground nutmeats and analysis of the liver detected chlorophacinone residues at 0.47 ppm.
I009118-001	1999	N/R	Probable	NY	Urban	Squirrel (1)	A squirrel was found dead in Central Park, Manhattan. Several large tan necrotic areas were present in the liver. The stomach contained nutmeats. An analysis of the liver detected chlorophacinone residues at 0.29 ppm.
I012972-001	2002	N/R	Probable	KS	Field	Turkey (2)	Two wild turkeys were found dead approximately 100 yards from a prairie dog town that has been baited with poisoned grain two and a half to three weeks prior to submission. The suspected poison was Rozol® pocket gopher poison. The landowner that found the turkeys contacted the Kansas Department of Wildlife and Parks. Necropsy showed dilated vessels in the crop area and diffuse hemorrhage around the crop. Pebbles and green feed material are present in the ventriculus. The gastrointestinal tract contains blue green grain in the crop. An analysis of the livers detected chlorophacinone residues of 0.69 and 0.40 ppm.
I013810-013	1999	N/R	Probable	NY	Urban	Hawk (1)	This incident was part of the Contaminant Exposure and Effects – Terrestrial Vertebrates (CEE-TV) Database, Version 3.3, October 2002 report. A red-tailed hawk was found in Manhattan. Necropsy results showed 0.18 ppm chlorophacinone residues in the liver.
I020607-001	2009	N/R	Highly Probable	KS	Field	Badger (1)	A dead badger was found on a private property. The liver was tested and chlorophacinone residues of 4.4 ppm (with a detectable limit of 0.25 ppm) were detected. It was determined the badger died from secondary poisoning, most likely resulting from use of chlorophacinone to control prairie dogs in the area.

I020996-001	2009	N/R	Possible	KS	Field	Wild Turkey (45)	Forty-five dead wild turkeys that were found dead in and near the small town of Russell Springs, KS. Analyses of 6 of the turkey found phosphene gas in the crop contents, indicating poisoning by zinc phosphide. However, chlorophacinone was also detected in the crop contents of one of the turkeys, indicating that it may have also contributed to causing the mortality of some of the birds.
I020996-003	2009	N/R	Possible	KS	Field	Raccoon (1)	A dead raccoon was recovered near Russells Springs, KS. Several areas of hemorrhages were detected under the skin and on the surface of organs. Chlorophacinone was detected in the liver. The source of chlorophacinone was suspected to have been the extensive use of Rozol® in the area for prairie dog control.

Table D6. Wildlife Mortality Incidents Attributed to Use of Bromethalin

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species and (Number Affected)	Comments
I007155-060	1996	Reg. Use	Probable	WI	Unknown	Chipmunk	Use of Gold Crest Vengeance to control mice reportedly resulted in the mortality of a chipmunk. Evidently the chipmunk was taken to a veterinary clinic for treatment.
I014717-001	2003	Reg. Use	Unlikely	GA	Rural	Barn owl (1) Great horned owl (1) Red-tailed hawk (1)	A red-tailed hawk and a barn owl were being held in captivity as part of an education program in a GA State Park. The hawk was found to be lethargic and incapacitated in its cage. Despite treatment, it died within six days. The barn owl was found in its cage lethargic with fluffed feather, and died before treatment could be given. A half-eaten dead rat was found in the hawk's cage, and another dead rat was found between the hawk's and the owl's cages. Toxicological results showed brodifacoum in the liver of both birds. Two great horned owls later showed similar symptoms as the hawk and barn owl (not perching, pale tongue). They both were treated with vitamin K and recovered. Rats were being controlled at the park using Maki Rat and Mouse Bait (bromadiolone), Contract Blox (bromadiolone), and Real Kill Rat and

Incident ID	Year	Legality	Certainty	State	Land Use	Generic Species and (Number Affected)	Comments
							Mouse Killer (bromethalin).