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Ecological Monitoring at the Paducah Gaseous Diffusion Plant: Historical Evaluation and Guidelines for Future Monitoring Quality Assurance

Prepared by
Kentucky Research Consortium for Energy and Environment
233 Mining and Minerals Building
University of Kentucky, Lexington, KY 40506-0107

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By:

Richard S. Halbrook
Cooperative Wildlife Research Laboratory
Southern Illinois University
Carbondale, Illinois

Howard H. Whiteman
Department of Biological Sciences
Murray State University
Murray, Kentucky

Lenn Roberts
908 Dulaney Valley Court
Towson, Maryland 21204

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Introduction

Investigations to identify ecological impacts from historical and present Paducah Gaseous Diffusion Plant (PGDP) operations have been formally underway since the late 1980's. Annual sampling programs have addressed ecological impacts on specific components of various aquatic and terrestrial populations that inhabit the PGDP, its' environs, and the West Kentucky Wildlife Management Area (WKWMA). Sampling programs have been conducted by Department of Energy (DOE) contractors, Oak Ridge National Laboratory, the Commonwealth of Kentucky Division of Waste Management, the University of Kentucky, and many others. Annual and special sampling programs have been conducted under the authorities of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), and Clean Water Act (CWA). Additional investigations were implemented as part of the DOE Environmental Management (EM) Program. Numerous documents summarizing PGDP ecological investigations and substantial quantities of data have been distributed and/or published (Birge and Price 2000, Seaborg 2001).

No single document presently exists that identifies and summarizes all PGDP ecological assessment activities that have been conducted to date. Therefore, the infusion of historical data and information into present and future PGDP ecological assessment activities and decision-making would require the input of numerous individuals that were directly involved in past PGDP activities or the expenditure of substantial research time and money.

The nature of ecological assessment activities at the PGDP requires the participation of many stakeholders including government agencies, contractors, and the public. The stakeholders that participate in these ecological assessment activities have different ecological information needs and significantly different technical backgrounds.

The current project collected, evaluated, and summarized the numerous assessment and management activities that have been conducted at the PGDP in order to provide an ecological strategy to guide future efforts. The outcome is a "living document" that can serve as a basic reference for past and future ecological assessments and management-related activities. This document is written so that it can be understood by managers, project participants, and other stakeholders and interested individuals who require information related to past impacts and the future management of ecological resources at the PGDP and WKWMA. The emphasis of this document is exposure and accumulation of contaminants in "ecological resources" rather than an evaluation of human health concerns; therefore, results may not have a direct relationship to potential human impacts. However, detection of contaminants in ecological resources (i.e., wild species) indicates that environmental contaminants are bioavailable, and therefore, may occur in humans that are similarly exposed, or may eventually affect human health through food chain transfer, Knowing what specific contaminants are accumulating in which specific biological components of the environment will provide valuable information to resources managers making decisions and implementing specific actions to safeguard ecological resources and potential human exposure.

The specific objectives of this study were to: 1) compile a history of ecological investigative and research related activities for the PGDP and it's environs; 2) identify contaminants of ecological concern resulting from activities at the PGDP; 3) develop conceptual models of potential food web transfer of identified contaminants through terrestrial and aquatic environments; 4) identify regulatory requirements that have driven historical management activities and current regulations that will drive future management activities; 5) identify data gaps that exist in ecological information; and 6) provide recommendations for future ecological assessment activities that will address the long-term monitoring and data requirements of the agencies managing the PGDP and associated stakeholders.

It is emphasized that this document is a "living document" and as such can be modified as additional data are discovered or become available, or if standards should change. This document focuses on the terrestrial environment and does not include fish data except where that information specifically relates to the feeding habits of specific terrestrial species. Tables containing contaminant concentrations of concern and the greatest concentrations measured in various indicator species at the PGDP are included (Tables 1.2 – 1.4), and are designed to provide the reader with a means to evaluate the current knowledge regarding potential contaminant impacts on ecological resources at the PGDP. In some cases, contaminant concentrations of concern have not been established for certain groups of animals. This is especially true for amphibians and reptiles. Until contaminant concentrations of concern are established for these animals, analytical results will have to be compared between animals captured on or near the PGDP and those captured at reference locations.

This document is organized into two chapters. Chapter One identifies contaminants of concern, justifies species selection for ecological monitoring, and describes specific monitoring plans. Chapter Two contains historical data relating to specific species. It is intended that Chapter One provide the basis of the living document and future ecological monitoring at the PGDP, while Chapter Two provides an historical perspective for those that may be interested.

CHAPTER ONE

Identification of Contaminants of Concern

Various strategies were used in selecting contaminants that were evaluated by past ecological studies. It appears that some studies analyzed a suite of metals and radionuclides, as well as various PCB Arocolors (Seaborg 2001, MSAL 2002, also see various Annual Site Environmental Reports), while other studies were more selective in their choice of contaminants for analyses (Birge and Price 2000, McKernan 2002). These past reports were helpful in narrowing potential contaminants to a list that is manageable and suitable from both an historical use and a biological significance perspective (Table 1.1). Although any contaminant may be harmful at certain concentrations, those suggested for monitoring are ones for which elevated environmental concentrations are suspected at the PGDP, or those that have been documented in published literature to potentially have an adverse affect on wild species. It is not the intent of this document to state that the contaminants listed in Table 1.1 are the only contaminants to be analyzed during future ecological studies. Because this is a living document, additional contaminants may be added to this list or contaminants on the current list may be deleted as warranted following review and consensus of responsible parties. However, it is the intent of this document to suggest that the contaminants of concern listed in Table 1.1 be analyzed in all future ecological studies conducted at the PGDP. For PCBs, it is recommended that the concentrations of individual congeners, including the non-ortho and mono-ortho congeners and the dominant congeners that occur in Aroclor 1254 and 1260, be evaluated in addition to the concentrations of Aroclors 1254 and 1260. The specific tissues to be evaluated should be those in which the greatest concentration of the specific contaminant is likely to be measured (i.e., fat – PCBs; liver – metals, PCBs, radionuclides; kidney – metals, radionuclides; muscle – radionuclides) or the tissue that may be associated with the greatest potential of adverse effects (in the case of human consumption, deer muscle tissue).

Included in Tables 1.2 – 1.4 are the concentration of each contaminant that is considered critical for wild species (if known), along with the reference that cited the critical value. Critical concentrations are concentrations at which previous studies have suggested that the potential exists for adverse effects to occur. The identified critical values are conservative and are not intended to suggest that adverse effects are likely at these concentrations. Rather, they are intended to indicate when a more detailed evaluation of the contaminant data may be warranted. Future analyses should insure that the level of detection for each contaminant is below the listed critical value for that contaminant. In addition, future studies should insure that details regarding analytical data (i.e., whether concentrations are measured as dry weight or wet weight, % moisture, % lipid) are included in reports from the analytical laboratories and that analytical reports specify quality control information including criteria for evaluating precision and accuracy; as well as, what actions were taken if these criteria were violated.

Selection of Species for Ecological Monitoring

Since the 1980's, there have been numerous ecological studies conducted on or near the PGDP to evaluate accumulation of potentially harmful contaminants in terrestrial biota. Among these, deer are the only species routinely monitored. However, studies conducted as part of planned investigations have measured contaminant concentrations in amphibians, small mammals (rodents), rabbits, raccoons, bats, and starling, while data from opportunistic sampling of red-tailed hawk, otter, opossum, bobcat, coyote, mink, beaver, and copperhead also are available (See Chapter Two). In order to develop data that will be useful to managers making future decisions regarding ecological resources, it will be necessary to establish routine monitoring of key indicator species. Because wild species integrate contaminants over temporal and spatial scales, routine monitoring of indicator species will provide information on the bioavailability and accumulation of contaminants within the home range of monitored species, as well as providing data on year-to-year trends.

To identify data gaps in our knowledge regarding contaminant burdens in terrestrial species, food web models were developed (Figures 1.1 – 1.4), and indicator species were identified using a set of selection criteria. These models suggest that there are major data gaps with respect to information available for evaluation of contaminant uptake and accumulation in the ecological community at/or surrounding the PGDP. Specific gaps were identified in insectivorous and predatory avian species, mid and upper trophic level mammalian species, and amphibian and reptilian species in general. To alleviate these data gaps, this document identifies species that are recommended for inclusion in future ecological monitoring at the PGDP. Species were selected based on one or more of the following criteria: identified data gaps at the PGDP, trophic position, suitability for monitoring, and availability of a literature-derived contaminant database for the specific species. Suitability for monitoring consideration included ability to obtain an adequate sample size, home range, existing standardized capture techniques, and history of use in contaminant studies at the PGDP and/or elsewhere.

The following species have been identified and are recommended for inclusion in future ecological monitoring at the Paducah plant: white-tailed deer (*Odecoileus virginianus*), raccoon (*Procyon lotor*), American kestrel (*Falco sparverius*), European starling (*Sturnus vulgaris*), southern/northern water snake (*Nerodia fasciata/Nerodia sipedon*), and bullfrog (*Rana catesbeiana*).

White-tailed deer

The white-tailed deer is recommended from a human health and historical perspective rather than from an ecological perspective. Because deer are hunted and consumed by humans, are of interest to the local community, and because there is an historical database for this species, continued monitoring is justified. In addition, there are specific DOE orders mandating monitoring of deer (DOE Order 5400.5). Metal, radionuclide, and PCB concentrations previously measured in deer have all been below concentrations associated with adverse effects in mammalian species (Table1.2). Elevated lead concentrations were reported for deer collected during 1992 monitoring (910 mg/kg muscle); however, data from reanalysis were highly variable compared to the results of the original analysis and no definitive conclusions could be reached (Logsdon and Davis 1993). Similarly, elevated mercury concentrations were reported in deer monitored in 1993 (2.1 mg/kg Hg in liver, 6.6 mg/kg Hg in muscle). However, reanalysis of these tissues, along with tissues collected from additional deer harvested that year, indicated lower concentrations and suggested errors in the original analysis.

Raccoon

The raccoon is a medium sized omnivorous mammal, relatively abundant on the PGDP and surrounding environment, has previously been used to monitor accumulation and effects of contaminants at the PGDP, and are easily trapped using standardized trapping techniques. Because of its' trophic position, the raccoon will provide data for evaluating biological availability and accumulation of contaminants among mid-trophic level mammalian species. Previous raccoon tissue analyses indicate that contaminant concentrations in some individuals collected on or near the PGDP (13 mg/kg Aroclor 1260 in fat; CDM 2000) are slightly greater than the concentrations of concern (>10 mg/kg Aroclor 1260 in fat Table 1.2) in mammalian species. A maximum total PCB concentration of 39.5 ppm in fat also has been reported (Texas Tech 1999). It is emphasized that concentrations previously detected in raccoons do not necessarily indicate adverse effects, but rather suggest that additional study and evaluation of PCBs in this species is warranted, and that other midlevel omnivorous mammals (i.e., skunks and opossum) or top trophic level carnivores may also be accumulating PCBs.

Although it would be valuable to have a specific top trophic level carnivore as a species for routine monitoring, the relative abundance of a top predatory species utilizing habitat at or near the PGDP does not justify annual trapping for monitoring purposes. However, it is recommended that as individual top carnivorous species become available through incidental trapping, road kill, or from other sources, that the suite of contaminants of concern listed in Table 1.2 be evaluated in the appropriate tissues collected from these species. Potential top trophic level carnivorous species of interest would include bobcat (*Lynx rufus*), coyote (*Canis latrans*), river otter (*Lontra canadensis*), and mink (*Mustela vison*). In addition, tissue analyses of bat species that become available would provide useful information.

European starling

The starling is a generalist mid-trophic level non-native species that consumes mostly insects (~90 % of diet) during the nesting season (spring), and a variety of food (~30 - 50 % insects) during the rest of the year (Martin et al. 1951). Starlings readily use nest boxes placed in open areas, their diet is similar to that of many native species, and they tolerate human activity and disturbance. These characteristics make them an excellent species for monitoring. There are standard protocols for monitoring starlings and they have previously been used to evaluate accumulation and effects of contaminants at the PGDP. Previous starling studies at the PGDP suggest that kidney lead concentrations (max. 5 mg/kg wet weight, McKernan 2002) exceeded the kidney lead concentration of concern (2 mg/kg wet weight, Table 1.3) and would warrant additional evaluation in future studies. Similarly, previous starling studies at the PGDP reported a maximum kidney aluminum concentration of 38.9 mg/kg wet weight (McKernan 2002); however, no critical tissue concentrations for aluminum were found for avian species, although liver aluminum concentrations of 15.5 mg/kg dry weight have been associated with decreased growth (Capdeveille and Scanes 1995). McKernan (2002) reported no decrease in growth in 15 day old starlings collected from the PGDP, yet aluminum concentrations would warrant additional evaluation in future studies.

American kestrel

The American kestrel is a top carnivorous avian species feeding mostly on small mammals and insects, although amphibians and reptiles are occasionally eaten (Martin et al. 1951). Kestrels will readily use nest boxes during the breading season, which facilitates collection of samples for contaminant analyses, and they have previously been used to monitor bioavailability and accumulation of contaminants in avian species (Smits and Bortolotti 2001, Tella et al. 2002).

Studies of both the European starling and American kestrel use contaminant data measured in chicks raised in nest boxes that have been placed at specific locations selected for monitoring. In both cases, adults feel chicks animal matter (prey) gathered during the breeding season. Contaminants measured in chicks would represent those that are bioavailable to the prey and transferred to the starling or kestrel. Therefore, monitoring starlings and kestrels will provide data to evaluate potential contaminant availability and bioaccumulation in mid-trophic level insectivorous and top trophic level carnivorous avian species. In addition to the starling and kestrel, contaminant data from great blue heron (*Ardea herodias*) and kingfisher (*Megaceryle alcyon*) would be valuable for evaluating the availability and accumulation of contaminants among fish-eating avian species. However, unless a heron breeding colony is located near the PGDP or the density of kingfishers nesting along creeks and ponds associated with the PGDP is adequate, these species would not be recommended for routine monitoring, although opportunistic sampling would be recommended. Wild turkey (*Meleagris gallopavo*) and bobwhite quail (*Colinus virginianus*) were also considered as avian species for contaminant monitoring at the PGDP; however, they are thought to be of greater value from a human health standpoint than from an ecological monitoring standpoint.

Amphibians and reptiles

Data gaps also exist for amphibian and reptilian species at the PGDP; however, selection of a species that meets the monitoring criteria established above is more difficult for these biological groups. The southern and/or northern water snake, and bullfrog may provide the best data for evaluating contaminant bioavailability and accumulation in amphibians and reptiles and are recommended for routine monitoring. Water snakes eat mainly fish and amphibians (EPA 1993, Phillips et al. 1999), are relatively abundant in drainage ditches, outfalls, ponds, and creeks near the PGDP, and occupy an upper trophic level. Bullfrogs are relatively abundant on or near the PGDP, are herbivorous as aquatic tadpoles and carnivorous as semi-terrestrial adults, and provide sufficient sample size for analysis. In addition, bullfrogs are often used as food for humans in western Kentucky. However, as with most amphibian and reptilian species, there is little data to indicate critical contaminant concentrations for water snakes or bullfrogs (Meyers-Schöne 2000). Until concentrations of concern become available, contaminant concentrations measured in the water snake and bullfrog will provide data on bioavailability, and the difference in tissue concentrations between samples collected on or near the PGDP and those collected from reference locations will need to be evaluated in order to provide an indication of potential concerns.

It has been suggested that a turtle species (snapping turtle *Chelydra serpentine*) also be included in future monitoring at the PGDP. This may be warranted if elevated contaminant concentrations are measured in water snakes, or if the density and distribution of snapping turtles suggest that they would provide data that would be helpful for making management decisions.

Monitoring Protocols

The following are monitoring protocols suggested for species recommended for study at the PGDP. These species, and the data generated through monitoring, are specifically selected to fill data gaps in ecological resources and provide resource managers with knowledge that will be valuable in making decisions and implementing specific actions to safeguard ecological resources and reduce human exposure. Except for deer, these species are not currently part of the KRCEE project.

Frequency of monitoring

It is recommended that all species selected as indicator species be initially monitored for three consecutive years. If contaminant concentrations measured in individual tissue samples of a monitored species on or near the PGDP are less than 90% of the critical concentrations listed in Tables 1.2 – 1.4, or in the cases where critical contaminant data are not available, if the concentrations are statistically similar to or below concentrations measured in tissues of the same species collected from reference sites, it is recommended that the frequency of monitoring be changed to once every other year for six years, followed by once every three years thereafter. If at any time any individually measured tissue concentration is within 90% of the listed critical concentration, or, in the cases where critical contaminant data are not available, if the concentrations are statistically greater than those measured in tissues from the same species collected at reference locations, then the three consecutive years monitoring cycle should begin again (Figure 1.5).

Objectives of monitoring protocols:

1. Measure contaminants of concern in selected species collected on or near the PGDP and from reference locations. At a minimum, metals should be

measured in muscle, kidney, and liver tissue; PCBs should be measured in fat and liver tissue; and radionuclides should be measured in bone, muscle and liver tissue.

2. Compare measured contaminant concentrations with contaminant concentrations of concern or statistically compare contaminant concentrations measured in samples collected from the PGDP with those collected from reference locations to identify contaminants and trophic pathways that need further evaluation.

Deer Monitoring Protocol

Annually, prior to the hunting season, 8 deer from near the PGDP (West Kentucky Wildlife Management Area) should be harvested following protocols that have been previously established (see Annual Site Environmental Reports). The deer should be necropsied and liver, fat, kidney, muscle and bone tissue should be collected and analyzed for the appropriate contaminant using established protocols.

Raccoon Monitoring Protocol

Forty appropriately-sized box traps should be placed at locations likely to capture raccoons on or near the PGDP. An additional 20 traps should be place > 5 km from the PGDP in suitable raccoon habitat. Traps should be appropriately baited, set, and checked daily for 3 weeks during February and/or March. Captured raccoons should be immobilized and the sex, age class, and weight recorded. Twenty randomly-selected adult raccoons from each trapping location should be euthanized and contaminants of concern measured in the appropriate tissues. Captured raccoons that are not collected for contaminant analysis, should have a uniquely numbered ear tag attached for future identification. Population profiles (age class, weight, and sex distributions) should be maintained for comparisons between trap locations and among years.

Kestrel Monitoring Protocol

Twenty kestrel nest boxes should be placed on trees or poles at approximately equal distances from each other around the outside perimeter fence of PGDP. A similar number of next boxes should be placed in suitable habitat approximately 5 km from the plant and will serve as reference. Attempts should be made to locate the reference nest boxes in areas that would not be subjected to the influences of the PGDP. Nest boxes should be approximately 4-6 m above the ground and monitoring should begin prior to nesting and continue through the nesting season. The number of nests constructed, number of eggs laid/nest, number of eggs that hatch/nest, and number of chicks that survive 25 days post-hatch/nest should be recorded. One 25 day-old chick (± 2 days) should be collected from each productive nest (nest containing ≥ 2 chicks), necropsied, and contaminant concentrations measured in appropriate tissues. All other kestrel chicks in each nest should have a US Fish and Wildlife Service leg band attached prior to fledging. Eggs that are abandoned or fail to hatch and chicks that die prior to 25 days of age also should be collected and contaminant concentrations measured in the appropriate tissues..

Starling Monitoring Protocol

Twenty-four starling nest boxes should be placed at selected locations within or near the perimeter fence of the PGDP. An additional 12 nest boxes should be placed at a suitable reference location at least 5 km from the PGDP. Monitoring of nest boxes should begin in April, prior to the nesting season, and continued until July, the end of the nesting season (Ohio Historical Society 2005). All boxes should be checked at 2-3-day intervals from nest initiation through chick hatching and daily from hatching to chick fledging. Productivity should be measured by recording the number of nests constructed, number of eggs laid per nest, number of eggs hatched per nest, and number of chicks that survived 15 days post-hatch. Chicks should be weighed (to the nearest 0.01 g) in the field on days 3 and 9 post-hatch, and all 15 – 18 day old chicks, eggs that are abandoned or failed to hatch, and chicks that die prior to 15 days of age, should be collected, necropsied, and contaminant concentrations measured in the appropriate tissues.

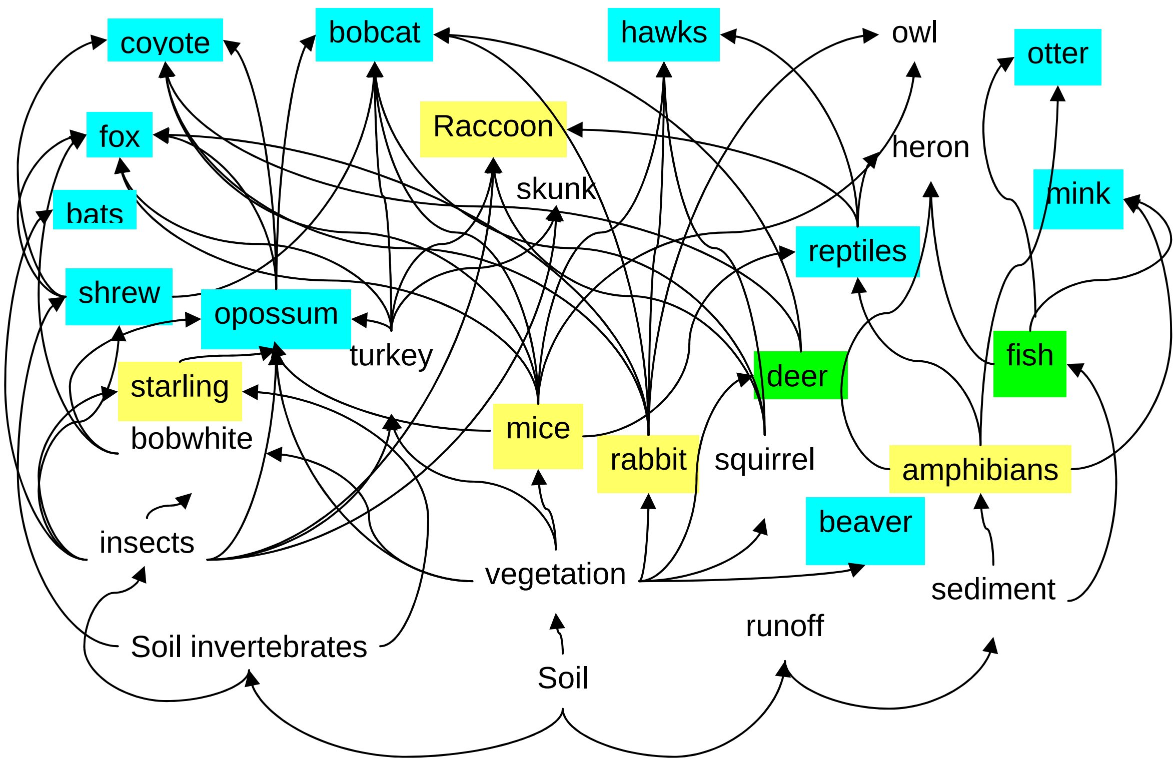
Water Snake Monitoring Protocol

During April – September, 15 water snakes should be collected from PGDP outfalls, and/or Big and Little Bayou Creeks by hand or by other appropriate means (drift fences with funnel traps, cover boards, etc.). Collections should be geographically spread throughout the PGDP area. An additional 10 water snakes should be collected from streams and creeks located greater than 5 km from the PGDP. Collected snakes should be euthanized, length, weight, and sex recorded, and appropriate tissues selected for contaminant analysis.

Bullfrog Monitoring Protocol

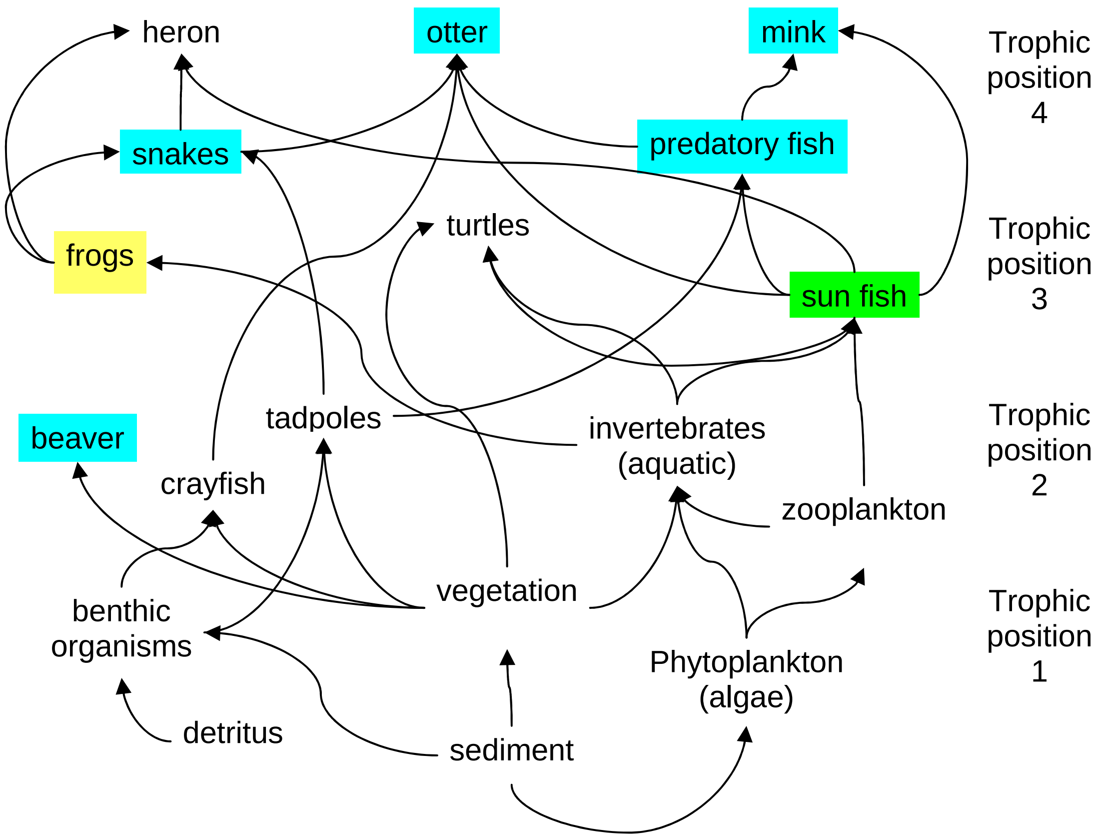
During April – September, 20 adult and 40 large (2nd-year) tadpole bullfrogs should be collected from outfalls, creeks, and ponds on or near the PGDP. Collections should be geographically spread throughout the PGDP. An additional 12 adults and 20 tadpoles should be collected from areas greater than 5 km from the PGDP. Collected frogs and tadpoles should be euthanized, length, weight, and sex recorded, and appropriate tissues selected for contaminant analysis.

Figure 1.1. Paducah Food Web Model (contaminants transfer model) (1)



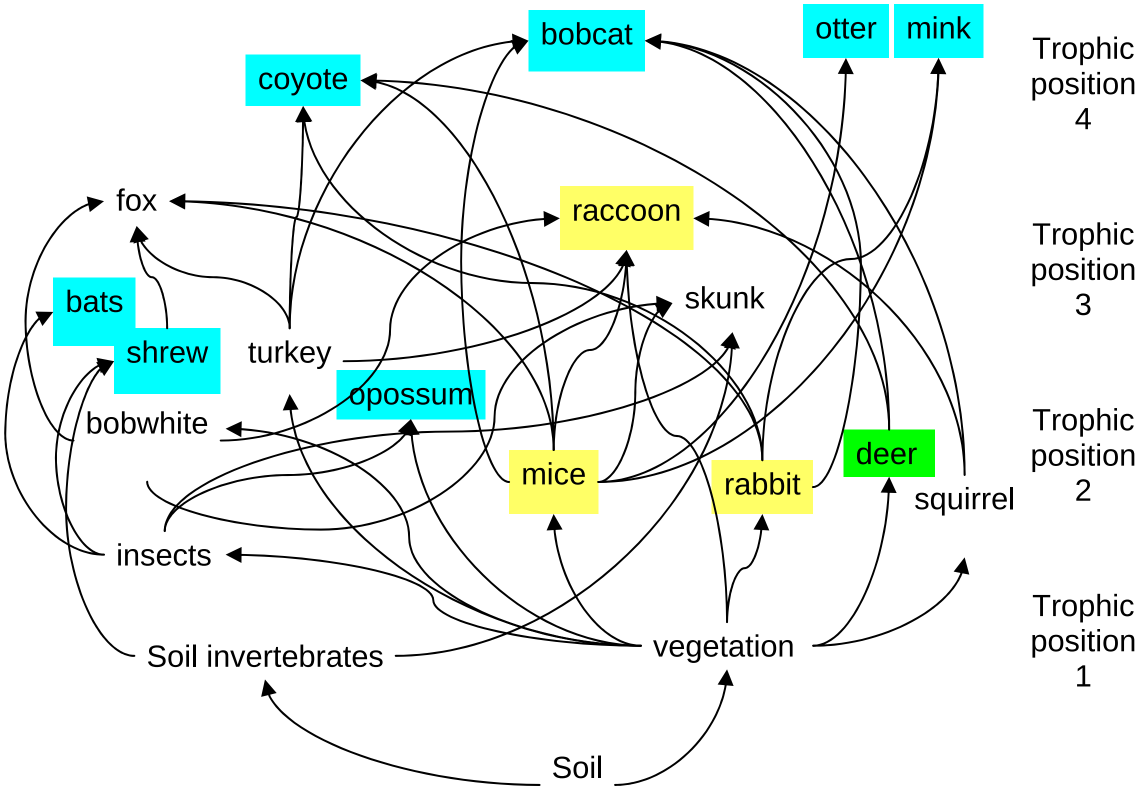
(1) Green boxes are species that have been monitored routinely, yellow boxes are species that have been periodically monitored, turquoise boxes are species that have been opportunistically monitored.

Figure 1.2. Aquatic Food Web and Trophic Position Model. (1)



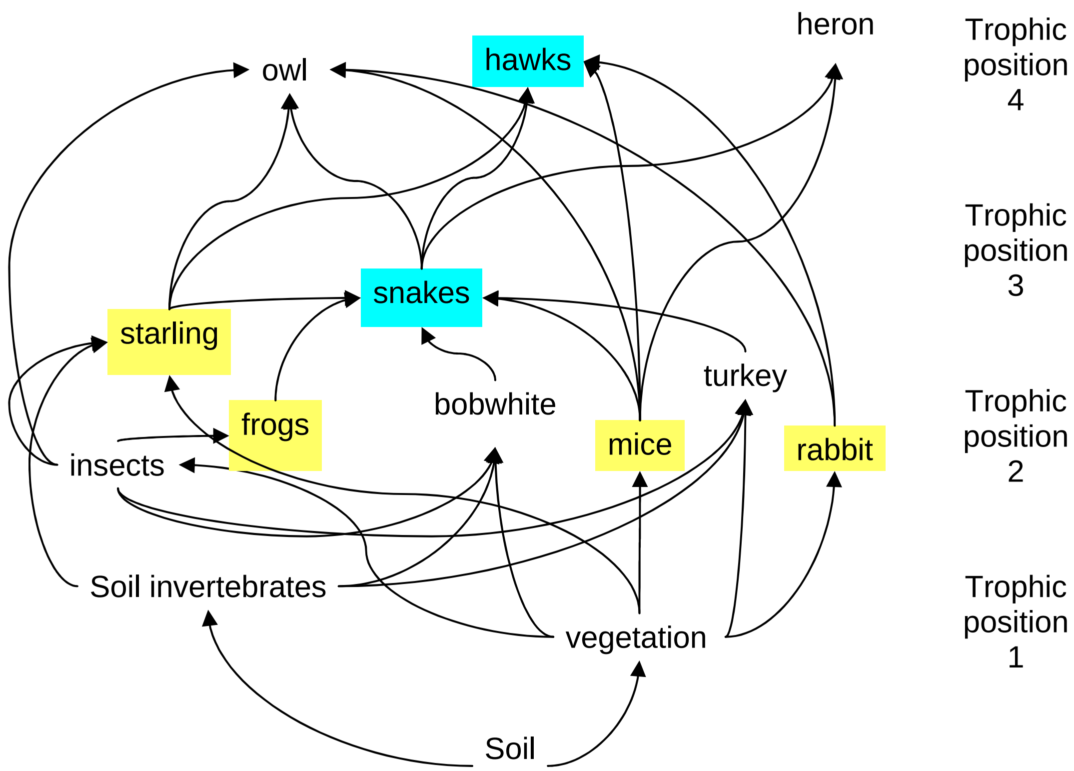
(1) Green boxes are species that have been monitored routinely, yellow boxes are species that have been periodically monitored, turquoise boxes are species that have been opportunistically monitored.

Figure 1.3. Terrestrial Mammalian Food Web and Trophic Position Model (1)



(1) Green boxes are species that have been monitored routinely, yellow boxes are species that have been periodically monitored, turquoise boxes are species that have been opportunistically monitored.

Figure 1.4. Terrestrial Avian Food Web and Trophic Position Model (1)

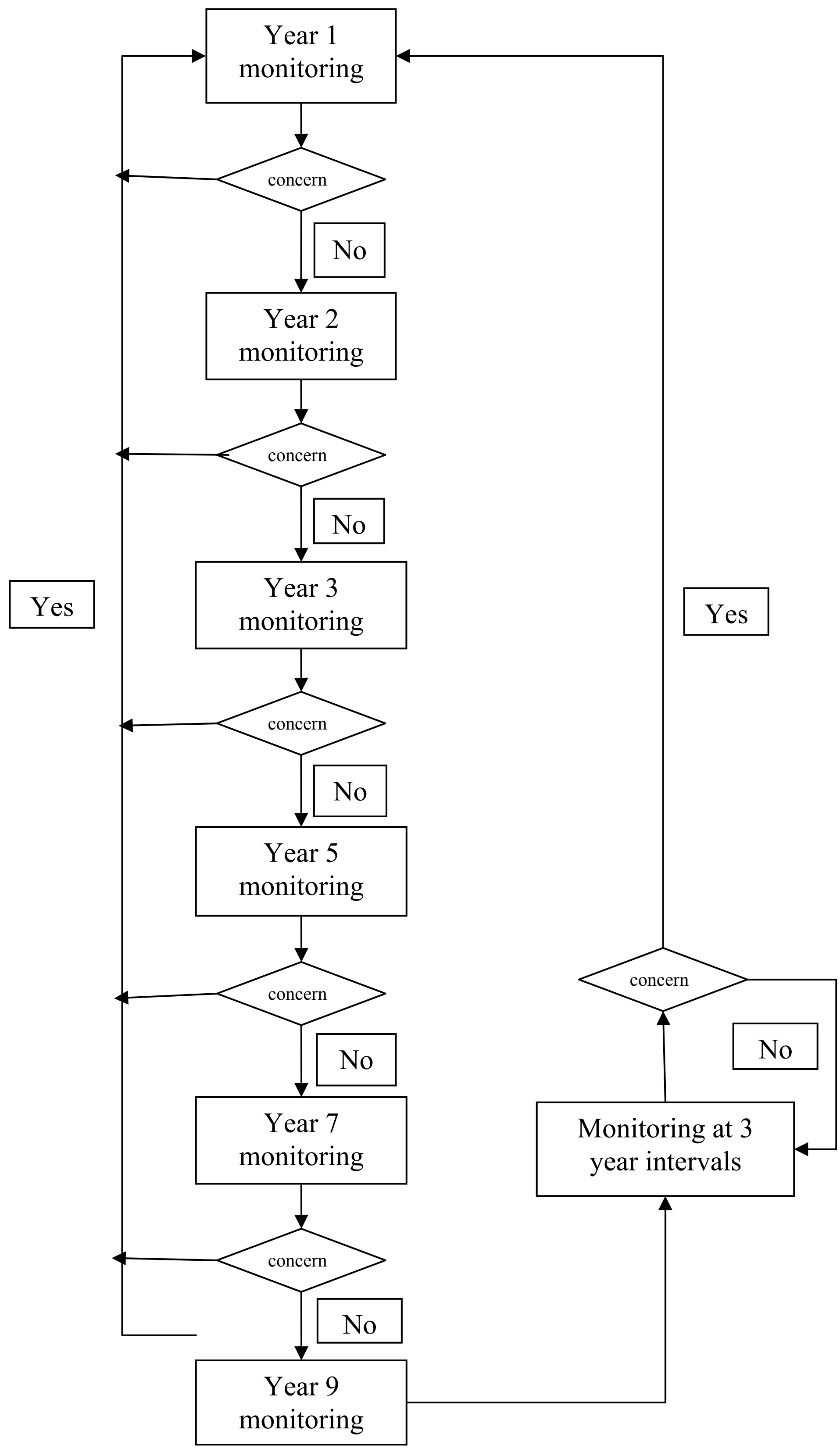


(1) Green boxes are species that have been monitored routinely, yellow boxes are species that have been periodically monitored, turquoise boxes are species that have been opportunistically monitored.

Table 1.1. Recommended metals, radionuclides, PCB Aroclors, and PCB Congeners for monitoring in tissues of species collected for ecological monitoring at the Paducah Gaseous Diffusion Plant, McCracken County, Kentucky.

Metal	Radionuclide	PCB Aroclor	PCB Congener
Aluminum (Al)	Cesium 137	1254	Non-ortho
Beryllium (Be)	Neptunium 237	1260	77
Cadmium (Cd)	Plutonium 239/240		81
Chromium (Cr)	Potassium 40		126
Lead (Pb)	Strontium 90		169
Mercury (Hg)	Technetium 99		Mono-ortho
Molybdenum (Mo)	Uranium 234		105
Nickel (Ni)	Uranium 235		114
Silver (Ag)	Uranium 238		118
Strontium (Sr)			123
Uranium (U)			156
			157
			167
			189
			Di-ortho (or greater)
			52
			70
			101
			105
			110
			118
			138
			149
			153
			180
			187

Figure 1.5. Recommended frequency for monitoring indicator species at the Paducah Gaseous Diffusion Plant, McCracken County, Kentucky.



CHAPTER TWO

Chapter Two consist of a series of tables summarizing historical data from previous ecological studies conducted at PGDP. Information included in the following tables are designed to provide the reader with a synopsis of known contaminant concentration data, while information in Chapter One is intended to provide guidance for future ecological study at the PGDP. The maximum concentrations measured in specific tissues from individual species are included in Tables 1-2 and 1-4. In some previous monitoring there have been uncertainties regarding the reported concentrations that have resulted in confusion. As previously indicated in this document, future studies should insure that details regarding analytical data (i.e., whether concentrations are measured as dry weight or wet weight, % moisture, % lipid) are included in reports from the analytical laboratories, and these reports should specify quality control information including criteria for evaluating precision and accuracy; as well as, what actions were taken if these criteria were violated.

Table 2-1: Radionuclides in deer samples from 1985 to 1990 (Annual Environmental Report 1985-1990).

Year Sampled	**Concentration (pCi/g wet weight)**						
	^{237}Np	**^{239}Pu**	**230Th**	**^{234}U**	**^{235}U**	**^{238}U**	**^{99}Tc**
1985	<8.9E^{-5}	5.3E^{-4}	<5.9E^{-4}	2.5E^{-3}	1.7E^{-4}	2.5E^{-3}	
1986		<0.022					<0.66
1988	0	-0.016 ± 0.035	-0.154 ± 0.024	0.065 ± 0.019	0.003 ± 0.009	0.017 ± 0.010	0.030 ± 0.062
1989	0.041 ± 0.029	-0.008 ± 0.017	0.005 ± 0.010	0.122 ± 0.068	0.016 ± 0.035	0.043 ± 0.041	-0.054 ± 0.703
1990	0	0	0	0.008	0	0	0

Table 2-2: Average detected radionuclide levels in deer harvested from 1990 to 2000 (Annual Environmental Reports 1990-2000).

Year Sampled	^{234}U	^{235}U	^{238}U	^{239}Pu	^{99}Tc	^{237}Np	^{230}Th	^{90}Sr
1990 bone	0.046	0.061	0.114					1.993
1990 liver	0.016	0.005	0.003					
1990 musc	0.010	0.002			0.166			0.023
1991 bone	0.016		0.013					2.392
1991 liver	0.022	-0.0004	0.006					
1991 musc	0.013	0			0.183			
1992 bone	0.084	0.036	0.024					
1992 liver	0.028	0.004	0.004					
1992 musc	0.030	0.011			-0.146			
1993 bone								1.865
1993 liver	0.010	0.003	0.003					
1993 musc	0.004	-0.001						
1994 bone	0.023	0.004	0.009					2.247
1994 liver	0.010	0.006	0.019					
1994 musc	-0.006	0			-0.027			
1995 bone	0.016		0.032					1.800
1995 liver	0.006							
1995 musc	0.010							
1996 bone	0.041	0.020	0.008					1.277
1996 liver	0.023		0.007					
1996 musc	0.020						0.014	
1997 liver								
1997 musc								
1998 bone	0.019							3.717
1998 liver								
1998 musc								
1999 bone	0.036							3.300
1999 liver							0.017	
1999 musc	0.016							
2000 bone	0.082		0.052					
2000 liver	0.067						0.217	
2000 musc	0.038							

Table 2-3. Mean of detects (number of detects) and range of contaminants in WKWMA deer muscle 2001-2004 (OREIS 2001-2004).

	Year Sampled							
Analyte	2001 Mean (Detects)	2001 Range	2002 Mean (Detects)	2002 Range	2003 Mean (Detects)	2003 Range	2004 Mean (Detects)	2004 Range
Al (mg/kg)	2.30[b] (5)	ND-2.58	1.60[b] (3)	ND-1.94	3.49[b] (5)	0.808-0.951	(0)	ND-ND
Sb (mg/kg)	(0)	ND-ND	0.955[jb*] (1)	ND-0.955	(0)	ND-ND	(0)	ND-ND
As (mg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
Ba (mg/kg)	0.0374[b] (6)	0.0151-0.0655	0.101[bj] (1)	ND-0.101	0.0816[b] (4)	ND-0.136	0.0386[b] (4)	ND-0.0648
Be (mg/kg)	0.0666[b] (6)	0.0517-0.0994	(0)	ND-ND	0.018[b] (1)	ND-0.018	(0)	ND-ND
Cd (mg/kg)	0.0422[b] (1)	ND-0.0422	(0)	ND-ND	(0)	ND-ND	0.186[b] (4)	ND-0.209
Cr (mg/kg)	0.220[b] (2)	ND-0.265	(0)	ND-ND	1.95 (5)	1.67-2.14	1.72[b] (5)	1.59-1.80
Co (mg/kg)	0.0344[b] (1)	ND-0.0344	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
Cu (mg/kg)	1.64 (6)	1.31-2.14	1.43[b] (6)	1.16-1.80	1.68 (5)	1.44-2.07	1.50 (5)	1.40-1.57
Fe (mg/kg)	37.2[j] (6)	27.8-46.4	34.5 (5)	29.6-41.4	39.7 (5)	32.3-46.3	39.3 (5)	34.0-44.2
Pb (mg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	0.952[b] (2)	ND-1.05
Mn (mg/kg)	0.186 (6)	0.127-0.290	0.207[b] (5)	0.120-0.293	0.202[b] (5)	0.131-0.271	0.208[b] (5)	0.175-0.276
Hg (mg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
Ni (mg/kg)	0.320[b] (6)	0.217-0.477	(0)	ND-ND	(0)	ND-ND	0.277 (1)	ND-0.277
Se (mg/kg)	(0)	ND-ND	0.26[b] (3)	ND-0.26	(0)	ND-ND	(0)	ND-ND
Ag (mg/kg)	0.621[j*] (1)	ND-0.621	17.9[jn*] (2)	ND-33.5	(0)	ND-ND	1.37[b] (1)	ND-1.37
Tl (mg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
V (mg/kg)	(0)	ND-ND	0.0669[b] (1)	ND-0.0669	0.115[b] (1)	ND-0.115	(0)	ND-ND
Zn (mg/kg)	5.13 (6)	ND-8.8	18.6 (5)	15.3-22.9	23.2[j] (5)	16.6-29.0	15.0 (5)	12.8-18.0
^{228}Ac (pCi/g)	5.719 (1 sample)	5.719-5.719						
^{127}Ce (pCi/g)	(0)	ND-ND						
^{210}Pb (pCi/g)	6.322[j] (1 sample)	6.322-6.322						
^{237}Np (pCi/g)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND

Table 2-3. Continued.

Analyte	Year Sampled							
	2001 Mean (Detects)	2001 Range	2002 Mean (Detects)	2002 Range	2003 Mean (Detects)	2003 Range	2004 Mean (Detects)	2004 Range
$^{239/240}Pu$ (pCi/g)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
^{40}K (pCi/g)	25.65 (2 samples)	22.98-28.32						
^{90}Sr (pCi/g)	(0)	ND-ND						
^{99}Tc (pCi/g)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
^{230}Th (pCi/g)	0.1236 (2)	ND-0.1286	0.109 (1)	ND-0.109	0.1259 (4)	ND-0.1581	0.05355 (1)	ND-0.05355
^{234}Th (pCi/g)	7.207 (1 sample)	7.207-7.207						
$^{233/234}U$ (pCi/g)							(0)	ND-ND
^{234}U (pCi/g)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND		
^{235}U (pCi/g)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
^{238}U (pCi/g)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND

b: analyte was also detected in one or more of the blanks
j: one or more of the values are estimated
n: one or more of the values had sample spike recoveries not within control limits
*: one or more of the samples had duplicate analysis not within control limits

Table 2-4: Mean of detects (number of detects) and range of contaminant concentrations in WKWMA deer kidney tissue 2001-2004 (OREIS 2001-2004).

	Year Sampled							
Analyte	2001 Mean (Detects)	2001 Range	2002 Mean (Detects)	2002 Range	2003 Mean (Detects)	2003 Range	2004 Mean (Detects)	2004 Range
Al (mg/kg)	2.42[b] (6)	1.86-3.70	(0)	ND-ND	1.68[b] (4)	ND-1.90	1.58[b] (3)	ND-2.43
Sb (mg/kg)	(0)	ND-ND	(0)	ND-ND	1.09 (1)	ND-1.09	(0)	ND-ND
As (mg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
Ba (mg/kg)	0.499[b] (6)	0.277-1.11	0.471[b] (5)	0.363-0.541	0.472 (5)	0.347-0.676	0.556 (5)	0.395-0.698
Be (mg/kg)	0.105[b] (6)	0.0666-0.162	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
Cd (mg/kg)	0.670[b] (6)	0.284-1.02	2.10[b] (5)	0.112-3.91	1.17[b] (5)	0.157-1.75	1.22 (5)	0.826-1.76
Cr (mg/kg)	0.236[b] (3)	ND-0.340	(0)	ND-ND	1.65 (5)	1.47-1.99	1.58[*b] (5)	1.21-1.88
Co (mg/kg)	0.196[b] (1)	ND-0.196	(0)	ND-ND	0.104[b] (2)	ND-0.106	(0)	ND-ND
Cu (mg/kg)	5.16[n] (6)	3.49-11.0	3.57 (5)	3.21-3.80	0.367[n] (5)	3.48-3.86	3.58 (5)	2.60-4.25
Fe (mg/kg)	66.6[j] (6)	42.4-105	51.32 (5)	42.4-68.5	49.9[n] (5)	30.9-69.6	65.9[jn] (5)	38.7-82.3
Pb (mg/kg)	0.470[b] (2)	ND-0.502	(0)	ND-ND	(0)	ND-ND	1.23[b] (2)	ND-1.48
Mn (mg/kg)	1.39[j] (8)	1.01-1.62	1.46 (5)	1.16-1.97	1.51 (5)	1.39-1.71	1.48 (5)	0.955-1.84
Hg (mg/kg)	0.028 (3)	ND-0.034	0.030 (2)	ND-0.034	0.065 (4)	ND-0.088	0.032[n] (5)	0.025-0.042
Ni (mg/kg)	0.320[b] (6)	0.225-0.476	(0)	ND-ND	0.227[b] (1)	ND-0.227	0.462[b] (5)	0.288-0.861
Se (mg/kg)	0.92[j] (6)	0.61-1.1	0.79[b] (5)	0.73-0.89	0.48[b] (5)	0.39-0.55	0.50[b] (5)	0.41-0.67
Ag (mg/kg)	1.84[b] (4)	ND-5.49	(0)	ND-ND	0.156[bn] (1)	ND-0.156	0.398[bn] (1)	ND-0.398
Tl (mg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
V (mg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
Zn (mg/kg)	10.6[jn] (6)	7.09-15.9	27.6[n] (5)	20.6-33.4	21.9[j] (5)	20.8-24.4	21.6 (5)	16.2-29.7

b: analyte was also detected in one or more of the blanks
j: one or more of the values are estimated
n: one or more samples had sample spike recoveries not within control limits
*: duplicate analysis on one or more samples not within control limits

Table 2-5. Mean of detects (number of detects) and range of contaminant concentrations in deer liver tissue 2001-2004 (OREIS 2001-2004).

Analyte	Year Sampled							
	2001 Mean (Detects)	2001 Range	2002 Mean (Detects)	2002 Range	2003 Mean (Detects)	2003 Range	2004 Mean (Detects)	2004 Range
Al (mg/kg)	12.5[b] (6)	1.81-63.2	1.38[b] (2)	ND-1.41	3.42[b] (4)	ND-5.69	1.48[b] (2)	ND-1.80
Sb (mg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	1.33[b] (1)	ND-1.33
As (mg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
Ba (mg/kg)	0.0816[b] (6)	0.0422-0.112	0.133[bj] (6)	0.114-0.174	0.113[b] (5)	0.0318-0.254	0.0831[b] (5)	0.0545-0.128
Be (mg/kg)	0.166[b] (6)	0.0894-0.234	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
Cd (mg/kg)	0.0859[b] (6)	0.0469-0.157	0.164[b] (1)	ND-0.164	0.149[b] (5)	0.0929-0.208	0.203[b] (3)	ND-0.225
Cr (mg/kg)	0.216[b] (4)	ND-0.307	(0)	ND-ND	2.55 (5)	1.91-3.13	2.41 (5)	2.24-2.73
Co (mg/kg)	0.0675[b] (6)	0.0363-0.103	0.171[b] (1)	ND-0.171	0.147[b] (5)	0.118-0.214	0.136[b] (2)	ND-0.148
Cu (mg/kg)	44.2 (6)	21.7-66.7	31.6 (5)	6.51-66.9	62.7[n] (5)	34.0-91.0	54.9 (5)	17.4-96.7
Fe (mg/kg)	102.2[j] (6)	57.4-138	106 (5)	48.0-223	70.8[n] (5)	56.8-81.7	89.9[n] (5)	59.9-129
Pb (mg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	1.18[bn] (3)	ND-1.34
Mn (mg/kg)	4.52 (6)	4.00-5.05	3.23 (5)	2.46-4.49	4.87 (5)	3.50-6.63	3.52 (5)	2.67-4.72
Hg (mg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
Ni (mg/kg)	0.312[b] (6)	0.279-0.359	0.277[b] (1)	ND-0.277	(0)	ND-ND	0.468[b] (2)	ND-0.661
Se (mg/kg)	0.32 (1)	ND-0.32	0.67[b] (1)	ND-0.67	0.73[b] (2)	ND-0.87	(0)	ND-ND
Ag (mg/kg)	0.416 (2)	ND-0.808	(0)	ND-ND	(0)	ND-ND	0.208[b] (2)	ND-0.234
Tl (mg/kg)	(0)	ND-ND	(0)	ND-ND	0.602 (1)	ND-0.602	(0)	ND-ND
V (mg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
Zn (mg/kg)	20.6 (6)	13.0-24.2	34.8 (5)	30.3-44.4	35.1[jn] (5)	22.2-44.8	32.6 (5)	26.1-43.5
^{137}Cs (pCi/g)	(0)	ND-ND						
^{237}Np (pCi/g)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
$^{239/240}$Pu (pCi/g)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
^{40}K (pCi/g)	5.06 (5)	3.429-8.368						

Table 2-5. Continued.

Analyte	Year Sampled							
	2001 Mean (Detects)	2001 Range	2002 Mean (Detects)	2002 Range	2003 Mean (Detects)	2003 Range	2004 Mean (Detects)	2004 Range
^{90}Sr (pCi/g)	(0)	ND-ND						
^{99}Tc (pCi/g)			(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
^{230}Th (pCi/g)	(0)	ND-ND	0.1359 (1)	ND-0.1359	0.1512[b] (2)	ND-0.1532	(0)	ND-ND
$^{233/234}$U (pCi/g)							0.04025 (1)	ND-0.04025
^{234}U (pCi/g)	0.0747 (3)	ND-0.08814	0.2537 (1)	ND-0.2537	(0)	ND-ND		
^{235}U (pCi/g)	(0)	ND-ND	(0)	ND-ND	0.01768 (1)	ND-0.01768	(0)	ND-ND
^{238}U (pCi/g)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
PCB-1016 (μg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
PCB-1221 (μg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
PCB-1232 (μg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
PCB-1242 (μg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
PCB-1248 (μg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
PCB-1254 (μg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
PCB-1260 (μg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	21.5 (1)	ND-21.5
PCB-1268 (μg/kg)			(0)	ND-ND	(0)	ND-ND	(0)	ND-ND

b: analyte was also detected in one or more of the blanks
j: one or more of the values are estimated
n: one or more samples had sample spike recoveries not within control limits
*: duplicate analysis on one or more samples not within control limits

Table 2-6. Mean of detects (number of detects) and range of radionuclides in deer bone 2001-2004 (OREIS 2001-2004).

Analyte	Year Sampled							
	2001 Mean (Detects)	2001 Range	2002 Mean (Detects)	2002 Range	2003 Mean (Detects)	2003 Range	2004 Mean (Detects)	2004 Range
^{137}Cs (pCi/g)	(0)	ND-ND						
^{237}Np (pCi/g)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
$^{239/240}$Pu (pCi/g)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
^{40}K (pCi/g)	48.58 (2 samples)	31.99-65.18						
^{90}Sr (pCi/g)	(0, 1 sample)	ND						
^{99}Tc (pCi/g)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
^{230}Th (pCi/g)	0.1223 (3)	ND-0.1490	0.1121 (1)	ND-0.1121	0.1282^{b} (3)	ND-0.1951	0.03708 (1)	ND-0.03708
$^{233/234}$U (pCi/g)			(0, 1 sample)	ND			(0)	ND-ND
^{234}U (pCi/g)	0.07928 (1)	ND-0.07928	3.38 (1)	ND-3.38	(0)	ND-ND		
^{235}U (pCi/g)	(0)	ND-ND	0.1612 (1)	ND-0.1612	(0)	ND-ND	(0)	ND-ND
^{238}U (pCi/g)	(0)	ND-ND	0.5717 (1)	ND-0.5717	(0)	ND-ND	(0)	ND-ND
b: analyte was also detected in one or more of the blanks								

Table 2-7. Mean of detects (number of detects) and range of PCB concentrations in deer abdominal fat 2001-2004 (OREIS 2001-2004).

Analyte	Year Sampled							
	2001 Mean (Detects)	2001 Range	2002 Mean (Detects)	2002 Range	2003 Mean (Detects)	2003 Range	2004 Mean (Detects)	2004 Range
PCB-1016 (µg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
PCB-1221 (µg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
PCB-1232 (µg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
PCB-1242 (µg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
PCB-1248 (µg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
PCB-1254 (µg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
PCB-1260 (µg/kg)	61.7 (6)	21.5-106	24.4 (2)	ND-28.8	(0)	ND-ND	52.2 (5)	18.8-81.0
PCB-1268 (µg/kg)			43.1 (2)	ND-46.1	34.7[p] (4)	ND-37.4	(0)	ND-ND
p: one or more samples had >25% difference between two columns								

Table 2-8. Mean of detects (number of detects) and range of PCB concentrations in deer rump fat 2001-2004 (OREIS 2001-2004).

Analyte	Year Sampled							
	2001 Mean (Detects)	2001 Range	2002 Mean (Detects)	2002 Range	2003 Mean (Detects)	2003 Range	2004 Mean (Detects)	2004 Range
PCB-1016 (µg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
PCB-1221 (µg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
PCB-1232 (µg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
PCB-1242 (µg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
PCB-1248 (µg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
PCB-1254 (µg/kg)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
PCB-1260 (µg/kg)	67.9 (6)	22.1-145	18.2 (1, 2 samples)	ND-18.2	(0)	ND-ND	79.6 (5)	23.0-147
PCB-1268 (µg/kg)			(0)	ND-ND	33.9^{p} (4)	ND-39.9	(0)	ND-ND

p: one or more samples had >25% difference between two columns

Table 2-9. Mean of detects (number of detects) and range of contaminant concentrations in deer muscle 2005-2008 (OREIS 2005).

	Year Sampled							
Analyte	2005 Mean (Detects)	2005 Range	2006 Mean (Detects)	2006 Range	2007 Mean (Detects)	2007 Range	2008 Mean (Detects)	2008 Range
Al (mg/kg)	2.39[b] (3)	ND-2.53						
Sb (mg/kg)	(0)	ND-ND						
As (mg/kg)	(0)	ND-ND						
Ba (mg/kg)	0.0874[b] (5)	0.0562-0.119						
Be (mg/kg)	(0)	ND-ND						
Cd (mg/kg)	0.185[b] (1)	ND-0.185						
Cr (mg/kg)	0.420[b] (5)	0.138-0.861						
Co (mg/kg)	(0)	ND-ND						
Cu (mg/kg)	1.48[b] (5)	1.27-1.64						
Fe (mg/kg)	71.4[J] (5)	41.9-160						
Pb (mg/kg)	(0)	ND-ND						
Mn (mg/kg)	0.510[b] (5)	0.303-1.04						
Hg (mg/kg)	(0)	ND-ND						
Ni (mg/kg)	(0)	ND-ND						
Se (mg/kg)	(0)	ND-ND						
Ag (mg/kg)	(0)	ND-ND						
Tl (mg/kg)	1.51[b] (2)	ND-2.24						
V (mg/kg)	0.337[b] (1)	ND-0.337						
Zn (mg/kg)	13.9 (5)	11.1-17.6						
^{237}Np (pCi/g)	(0)	ND-ND						
^{238}Pu (pCi/g)	(0)	ND-ND						
$^{239/240}$Pu (pCi/g)	(0)	ND-ND						
^{99}Tc (pCi/g)	(0)	ND-ND						

Table 2-9. Continued.

Analyte	**Year Sampled**							
	2005 Mean (Detects)	2005 Mean (Detects)	2006 Mean (Detects)	2006 Mean (Detects)	2007 Mean (Detects)	2007 Mean (Detects)	2008 Mean (Detects)	2008 Mean (Detects)
^{230}Th (pCi/g)	(0)	ND-ND						
$^{233/234}$U (pCi/g)	(0)	ND-ND						
^{235}U (pCi/g)	(0)	ND-ND						
^{238}U (pCi/g)	(0)	ND-ND						
a: analyte was also detected in one or more of the blanks b: one or more of the values are estimated c: spike recovery not within control limits								

Table 2-10. Mean of detects (number of detects) and range of contaminant concentrations in WKWMA deer kidney tissue 2005-2008 (OREIS 2005).

Analyte	Year Sampled							
	2005 Mean (Detects)	2005 Range	2006 Mean (Detects)	2006 Range	2007 Mean (Detects)	2007 Range	2008 Mean (Detects)	2008 Range
Al (mg/kg)	(0)	ND-ND						
Sb (mg/kg)	(0)	ND-ND						
As (mg/kg)	(0)	ND-ND						
Ba (mg/kg)	0.473[b] (5)	0.355-0.603						
Be (mg/kg)	(0)	ND-ND						
Cd (mg/kg)	1.88[b] (5)	0.497-3.34						
Cr (mg/kg)	0.222[b] (3)	ND-0.270						
Co (mg/kg)	(0)	ND-ND						
Cu (mg/kg)	4.07 (5)	3.60-4.73						
Fe (mg/kg)	82.3[*jn] (5)	50.5-98.6						
Pb (mg/kg)	(0)	ND-ND						
Mn (mg/kg)	1.82 (5)	1.69-1.92						
Hg (mg/kg)	(0)	ND-ND						
Ni (mg/kg)	(0)	ND-ND						
Se (mg/kg)	1.23[b] (5)	1.12-1.33						
Ag (mg/kg)	(0)	ND-ND						
Tl (mg/kg)	1.52[b] (1)	ND-1.52						
V (mg/kg)	0.222[b] (1)	ND-0.222						
Zn (mg/kg)	21.6 (5)	19.3-23.9						

b: analyte was also detected in one or more of the blanks
j: one or more of the values are estimated
n: one or more samples had sample spike recoveries not within control limits
*: duplicate analysis on one or more samples not within control limits

Table 2-11. Mean of detects (number of detects) and range of contaminant concentrations in deer liver tissue 2005-2008 (OREIS 2005).

Analyte	Year Sampled							
	2005 Mean (Detects)	2005 Range	2006 Mean (Detects)	2006 Range	2007 Mean (Detects)	2007 Range	2008 Mean (Detects)	2008 Range
Al (mg/kg)	3.07[jb] (3)	ND-3.20						
Sb (mg/kg)	1.49[b] (2)	ND-1.51						
As (mg/kg)	(0)	ND-ND						
Ba (mg/kg)	0.166[b] (5)	0.0866-0.223						
Be (mg/kg)	0.0139[b] (1)	ND-0.0139						
Cd (mg/kg)	0.254[b] (3)	ND-0.307						
Cr (mg/kg)	0.195[b] (5)	0.145-0.273						
Co (mg/kg)	(0)	ND-ND						
Cu (mg/kg)	39.7 (5)	18.8-65.0						
Fe (mg/kg)	101[j] (5)	86.2-111						
Pb (mg/kg)	(0)	ND-ND						
Mn (mg/kg)	4.58 (5)	2.87-5.56						
Hg (mg/kg)	(0)	ND-ND						
Ni (mg/kg)	(0)	ND-ND						
Se (mg/kg)	0.403[*b] (4)	ND-0.527						
Ag (mg/kg)	(0)	ND-ND						
Tl (mg/kg)	1.09[b] (4)	ND-1.41						
V (mg/kg)	0.248[b] (3)	ND-0.290						
Zn (mg/kg)	33.9[n] (5)	29.6-37.5						
^{237}Np (pCi/g)	(0)	ND-ND						
^{238}Pu (pCi/g)	(0)	ND-ND						
$^{239/240}$Pu (pCi/g)	(0)	ND-ND						
^{99}Tc (pCi/g)	(0)	ND-ND						

Table 2-11. Continued.

Analyte	Year Sampled							
	2005 Mean (Detects)	2005 Range	2006 Mean (Detects)	2006 Range	2007 Mean (Detects)	2007 Range	2008 Mean (Detects)	2008 Range
^{230}Th (pCi/g)	(0)	ND-ND						
$^{233/234}$U (pCi/g)	(0)	ND-ND						
^{235}U (pCi/g)	(0)	ND-ND						
^{238}U (pCi/g)	(0)	ND-ND						
PCB-1016 (µg/kg)	(0)	ND-ND						
PCB-1221 (µg/kg)	(0)	ND-ND						
PCB-1232 (µg/kg)	(0)	ND-ND						
PCB-1242 (µg/kg)	(0)	ND-ND						
PCB-1248 (µg/kg)	(0)	ND-ND						
PCB-1254 (µg/kg)	(0)	ND-ND						
PCB-1260 (µg/kg)	(0)	ND-ND						
PCB-1268 (µg/kg)	10.7 (1)	ND-10.7						

b: analyte was also detected in one or more of the blanks
j: one or more of the values are estimated
n: one or more samples had sample spike recoveries not within control limits
*: duplicate analysis on one or more samples not within control limits

Table 2-12. Mean of detects (number of detects) and range of radionuclides in deer bone 2005-2008 (OREIS 2005).

Analyte	Year Sampled							
	2005 Mean (Detects)	2005 Range	2006 Mean (Detects)	2006 Range	2007 Mean (Detects)	2007 Range	2008 Mean (Detects)	2008 Range
^{237}Np (pCi/g)	(0)	ND-ND						
$^{239/240}$Pu (pCi/g)	(0)	ND-ND						
^{99}Tc (pCi/g)	(0)	ND-ND						
^{228}Th (pCi/g)	0.3006 (5)	0.1289-0.3742						
^{230}Th (pCi/g)	(0)	ND-ND						
^{232}Th (pCi/g)	0.01624 (1)	ND-0.01624						
$^{233/234}$U (pCi/g)	(0)	ND-ND						
^{235}U (pCi/g)	(0)	ND-ND						
^{238}U (pCi/g)	(0)	ND-ND						
b: analyte was also detected in one or more of the blanks								

Table 2-13. Mean of detects (number of detects) and range of PCB concentrations in deer abdominal fat 2005-2005 (OREIS 2005).

	Year Sampled							
Analyte	2005 Mean (Detects)	2005 Range	2006 Mean (Detects)	2006 Range	2007 Mean (Detects)	2007 Range	2008 Mean (Detects)	2008 Range
PCB-1016 (µg/kg)	(0)	ND-ND						
PCB-1221 (µg/kg)	(0)	ND-ND						
PCB-1232 (µg/kg)	(0)	ND-ND						
PCB-1242 (µg/kg)	(0)	ND-ND						
PCB-1248 (µg/kg)	(0)	ND-ND						
PCB-1254 (µg/kg)	(0)	ND-ND						
PCB-1260 (µg/kg)	(0)	ND-ND						
PCB-1268 (µg/kg)	75.4 (2)	ND-110						
p: one or more samples had >25% difference between two columns								

Table 2-14. Mean of detects (number of detects) and range of PCB concentrations in deer rump fat 2005-2008 (OREIS 2005).

Analyte	Year Sampled							
	2005 Mean (Detects)	2005 Range	2006 Mean (Detects)	2006 Range	2007 Mean (Detects)	2007 Range	2008 Mean (Detects)	2008 Range
PCB-1016 (µg/kg)	(0)	ND-ND						
PCB-1221 (µg/kg)	(0)	ND-ND						
PCB-1232 (µg/kg)	(0)	ND-ND						
PCB-1242 (µg/kg)	(0)	ND-ND						
PCB-1248 (µg/kg)	(0)	ND-ND						
PCB-1254 (µg/kg)	(0)	ND-ND						
PCB-1260 (µg/kg)	(0)	ND-ND						
PCB-1268 (µg/kg)	83.8 (2)	ND-83.8						
p: one or more samples had >25% difference between two columns								

Table 2-15. Mean contaminant concentrations in PGDP white-footed mice and rice rats 1997 (McMurry and Smith 1997).

	Location Code[b] and Species									
	BBA		**DMR**		**NEC**		**NSD**		**WWK**	
Analyte[a]	Mice	Rats	Mice	Rats	Mice	Rats	Mice	Rats	Mice	Rats
As (ppm dry wt.)	0.046	0.032	0.135	0.166	0.059	0.054	0.125	0.035	0.057	1.075
Sb (ppm dry wt.)	ND	ND	1.493	0.806	ND	ND	ND	ND	ND	ND
Ba (ppm dry wt.)	10.716	5.118	8.613	7.743	9.691	5.554	8.250	5.183	8.662	4.963
Be (ppm dry wt.)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cd (ppm dry wt.)	0.474	4.095	1.035	0.519	0.480	0.229	0.346	1.186	0.549	0.150
Cr (ppm dry wt.)	1.941	0.706	1.620	1.055	1.275	0.983	1.227	0.850	1.049	1.777
Cu (ppm dry wt.)	11.915	11.311	13.356	11.793	13.873	11.716	14.495	10.878	13.859	10.493
Pb (ppm dry wt.)	3.388	ND	4.974	0.483	4.112	3.025	8.283	4.625	7.280	1.332
Ni (ppm dry wt.)	0.454	1.304	1.322	1.931	1.166	1.108	1.255	1.345	0.480	0.809
Tl (ppm dry wt.)	ND	ND	ND	ND	ND	ND	3.628	ND	ND	ND
Ag (ppm dry wt.)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Al (ppm dry wt.)	63.630	47.111	74.684	62.262	64.661	60.200	71.291	35.879	79.727	49.103
Fe (ppm dry wt.)	230.724	413.527	249.994	318.704	242.460	312.255	239.513	297.421	256.363	292.446
PCB-5 (ppb)	ND	ND	ND	1.65	ND	ND	ND	ND	ND	ND
PCB-12 (ppb)	ND	ND	7.90	7.15	ND	ND	ND	ND	ND	ND
PCB-28 (ppb)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-44 (ppb)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-66 (ppb)	1.37	ND	1.14	ND	ND	ND	ND	ND	ND	ND
PCB-110 (ppb)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-118 (ppb)	3.03	ND	4.31	3.96	ND	0.64	3.12	7.18	2.37	1.24

Table 2-15. Continued.

	Location Code[b] and Species									
	BBA		DMR		NEC		NSD		WWK	
Analyte[a]	Mice	Rats	Mice	Rats	Mice	Rats	Mice	Rats	Mice	Rats
PCB-153 (ppb)	19.26	16.33	20.87	25.79	12.78	17.06	99.63	43.24	12.23	14.51
PCB-138 (ppb)	2.43	3.98	7.51	11.35	5.25	7.67	19.95	16.40	7.00	5.89
PCB-180 (ppb)	7.06	34.97	23.23	26.01	15.07	36.88	274.45	71.30	7.34	11.16
PCB-170 (ppb)	1.86	4.71	7.37	5.47	3.54	5.55	110.27	3.04	3.80	1.37
Total PCBs[c] (ppb)	33.63	60.00	63.29	72.58	36.64	67.81	507.41	141.14	32.73	34.95

[a]Metals were measured in kidney tissues and PCBs were measured in liver tissues
[b]BBA – Big Bayou Creek & Anderson Road, DMA – Little Bayou Creek & McCaw Road, NEC – Northwest corner security fence, NSD – North south diversion ditch, WWK – Big Bayou Creek & Water Works Road
[c]Total PCBs is the sum of congeners 118, 153, 138, 180, and 170

Table 2-16. Radionuclides, and metals and PCB concentrations in composite rodent samples 2000 (CDM 2000).

Analyte	Composite Rodent Sample ID		
	MS0315-00	MS0322-00	VL0323-00
Uranium (pCi/g)	23	21.4	ND
Aluminum (mg/kg)	28.6	4.36	
Antimony (mg/kg)	ND	ND	
Barium (mg/kg)	2.98	ND	
Beryllium (mg/kg)	ND	ND	
Cadmium (mg/kg)	ND	ND	
Chromium (mg/kg)	ND	ND	
Cobalt (mg/kg)	ND	ND	
Copper (mg/kg)	6.79	3.33	
Iron (mg/kg)	269[a]	458	
Lead (mg/kg)	ND	ND	
Manganese (mg/kg)	6.81	1.71	
Nickel (mg/kg)	0.944	ND	
Silver (mg/kg)	ND	ND	
Thallium (mg/kg)	ND	ND	
Vanadium (mg/kg)	ND	0.364	
Zinc (mg/kg)	45.5	20.6	
Arsenic (mg/kg)	ND	ND	
Mercury (mg/kg)	ND	ND	
Selenium (mg/kg)	ND	ND	
Technetium-99 (pCi/g)	4.14	1.7	11.7
Cesium-137 (pCi/g)	ND	ND	ND
Neptunium-237 (pCi/g)	ND	ND	0.1
Plutonium-239/240 (pCi/g)	ND	ND	ND
Uranium-234 (pCi/g)	1.2	0.71	0.061
Uranium-235 (pCi/g)	0.11	0.055	ND
Uranium-238 (pCi/g)	4.1	2.8	0.38
Thorium-230 (pCi/g)	0.033	ND	0.055
Americium-241 (pCi/g)	ND	ND	ND
Cesium-137 (pCi/g)	ND	ND	ND
Cobalt-60 (pCi/g)	ND	ND	ND
Potassium-40 (pCi/g)		ND	
PCB-1016 (µg/kg)		ND	
PCB-1221 (µg/kg)		ND	
PCB-1232 (µg/kg)		ND	
PCB-1242 (µg/kg)		ND	
PCB-1248 (µg/kg)		ND	
PCB-1254 (µg/kg)		ND	
PCB-1260 (µg/kg)		850	

Table 2-17. Mean contaminant concentrations in small mammal composite samples calculated from concentrations above detection (number of detects) 2001 (Annual Environmental Report 2001).

Analyte	Mean Contaminant Concentrations			
	WF Mouse	Prairie Vole	Pine Vole	Least Shrew
Al (mg/kg)	124 (8)	55.175 (4)	44.4 (4)	34.45 (8)
Sb (mg/kg)				
As (mg/kg)	0.0277 (7)	0.00925 (4)	0.0148 (1)	0.04 (8)
Ba (mg/kg)	2.42^{n} (8)	4.17^{n} (4)	2.88^{n} (4)	3.67^{n} (8)
Be (mg/kg)				0.0023 (1)
Cd (mg/kg)	0.0580 (8)	0.00123 (4)	0.0134 (4)	0.06 (8)
Cr (mg/kg)	1.03 (8)	1.6^{n} (4)	1.02^{n} (4)	1.18^{n} (8)
Co (mg/kg)	0.166 (4)		0.126 (2)	0.18 (1)
Cu (mg/kg)	6.51 (8)		3.66 (4)	6.85 (8)
Fe (mg/kg)	114 (8)		69.8 (4)	159 (8)
Pb (mg/kg)	1.03 (8)		0.254 (4)	0.48 (8)
Mn (mg/kg)	5.59 (8)		3.88 (4)	2.52 (8)
Hg (mg/kg)	0.0221 (1)			0.040^{n} (8)
Ni (mg/kg)	1.48^{n} (8)		1.61^{n} (4)	1.36^{n} (8)
Se (mg/kg)	0.252^{n} (8)		0.0852^{n} (4)	0.45^{n} (8)
Ag (mg/kg)			0.117 (1)	
Sr (mg/kg)	7.00 (8)		6.63 (4)	6.49 (8)
Tl (mg/kg)	0.241 (2)		0.464 (1)	0.39 (1)
U (mg/kg)	0.812 (8)		0.0599 (4)	0.04 (8)
V (mg/kg)	0.184 (1)		0.163 (1)	0.16 (1)
Zn (mg/kg)	38.2^{n} (8)		28.6^{n} (4)	44.81^{n} (8)
^{137}Cs (pCi/g)				
^{210}Pb (pCi/g)				50.55 (1)

Table 2-17. Continued.

Analyte	Mean Contaminant Concentrations			
	WF Mouse	Prairie Vole	Pine Vole	Least Shrew
^{212}Pb (pCi/g)	0.997 (4)			
^{214}Pb (pCi/g)	1.52 (2)		0.941 (1)	
^{237}Np (pCi/g)				
^{239}Pu (pCi/g)				
^{40}K (pCi/g)	9.35 (3)		8.47 (4)	31.8 (1)
^{99}Tc (pCi/g)	5.80 (6)		3.17 (4)	
^{228}Th (pCi/g)	1.62 (2)			1.76 (2)
^{230}Th (pCi/g)				
^{232}Th (pCi/g)				
^{234}Th (pCi/g)				
^{234}U (pCi/g)	0.319 (2)			
^{235}U (pCi/g)	0.0084 (5)		0.001 (1)	
^{238}U (pCi/g)	0.225 (8)		3.51 (6)	3.66 (9)
PCB-1016 (µg/kg)				
PCB-1221 (µg/kg)				
PCB-1232 (µg/kg)				
PCB-1242 (µg/kg)				
PCB-1248 (µg/kg)				
PCB-1254 (µg/kg)				
PCB-1260 (µg/kg)	9.09E3 (8)		57.7 (4)	5.95E3 (8)
PCB-1268 (µg/kg)				

Table 2-18. Radionuclides in raccoon and opossum bone 2000 (CDM 2000).

Analyte	Organism Sampled		
	Possum Bone	Raccoon 1 Bone	Raccoon 2 Bone
Uranium (pCi/g)	ND	ND	ND
Strontium-90 (pCi/g)	ND	ND	0.6
Technetium-99 (pCi/g)	ND	ND	ND
Neptunium-237 (pCi/g)	ND	ND	ND
Plutonium-239/240 (pCi/g)	ND	ND	ND
Uranium-234 (pCi/g)	ND	0.26	0.17
Uranium-235 (pCi/g)	ND	ND	ND
Uranium-238 (pCi/g)	ND	0.46	0.34
Thorium-230 (pCi/g)	ND	ND	ND
Americium-241 (pCi/g)	ND	ND	ND
Cesium-137 (pCi/g)	ND	ND	ND
Cobalt-60 (pCi/g)	ND	ND	ND
Neptunium-237 (pCi/g)	ND	ND	ND

Table 2-19. Radionuclides in raccoon and opossum kidney 2000 (CDM 2000).

Analyte	Organism Sampled		
	Possum Kidney	Raccoon 1 Kidney	Raccoon 2 Kidney
Uranium (pCi/g)	ND	ND	ND
Technetium-99 (pCi/g)	ND	0.22	ND
Cesium-137 (pCi/g)	ND	ND	ND
Americium-241 (pCi/g)	ND	ND	ND
Cobalt-60 (pCi/g)	ND	ND	ND
Neptunium-237 (pCi/g)	ND	ND	ND
Uranium-234 (pCi/g)		0.15	0.17
Uranium-235 (pCi/g)		ND	ND
Uranium-238 (pCi/g)		0.44	0.29
Thorium-230 (pCi/g)		ND	ND

Table 2-20. Metal and PCB concentrations, and radionuclides in raccoon and opossum liver 2000 (CDM 2000).

Analyte	Organism Sampled		
	Opossum Liver	Raccoon 1 Liver	Raccoon 2 Liver
Aluminum (mg/kg)		2.54	2.19
Antimony (mg/kg)		ND	ND
Barium (mg/kg)		ND	ND
Beryllium (mg/kg)		ND	ND
Cadmium (mg/kg)		0.262	0.266
Chromium (mg/kg)		ND	ND
Cobalt (mg/kg)		ND	ND
Copper (mg/kg)		10.9	4.4
Iron (mg/kg)		878	608
Lead (mg/kg)		ND	ND
Manganese (mg/kg)		2.39	2.15
Nickel (mg/kg)		0.75	ND
Silver (mg/kg)		ND	ND
Thallium (mg/kg)		ND	ND
Vanadium (mg/kg)		0.624	0.364
Zinc (mg/kg)		45.3	27[a]
Arsenic (mg/kg)		ND	ND
Mercury (mg/kg)		0.081[n]	0.508
Selenium (mg/kg)		0.94	ND
Uranium (pCi/g)	ND	ND	ND
Technetium-99 (pCi/g)	ND	1.47	0.57
Cesium-137 (pCi/g)	ND	ND	ND
Neptunium-237 (pCi/g)	ND	ND	ND
Plutonium-239/240 (pCi/g)	ND	ND	ND
Uranium-234 (pCi/g)	ND	ND	ND
Uranium-235 (pCi/g)	ND	ND	ND
Uranium-238 (pCi/g)	ND	ND	ND
Thorium-230 (pCi/g)	ND	ND	ND
Americium-241 (pCi/g)	ND	ND	ND
Cobalt-60 (pCi/g)	ND	ND	ND
PCB-1016 (µg/kg)		ND	ND
PCB-1221(µg/kg)		ND	ND
PCB-1232 (µg/kg)		ND	ND
PCB-1242 (µg/kg)		ND	ND
PCB-1248 (µg/kg)		ND	ND
PCB-1254 (µg/kg)		ND	ND
PCB-1260 (µg/kg)		ND	ND
n: one or more samples with blanks not within control limits			

Table 2-21. Aroclor concentrations and radionuclides in raccoon fat 2000 (CDM 2000).

Analyte	Organism Sampled		
	Opossum Fat	Raccoon 1 Fat	Raccoon 2 Fat
Uranium (pCi/g)		ND	ND
Cesium-137 (pCi/g)		ND	ND
Neptunium-237 (pCi/g)		ND	ND
Americium-241 (pCi/g)		ND	ND
Cobalt-60 (pCi/g)		ND	ND
PCB-1016 (µg/kg)		ND	ND
PCB-1221(µg/kg)		ND	ND
PCB-1232 (µg/kg)		ND	ND
PCB-1242 (µg/kg)		ND	ND
PCB-1248 (µg/kg)		ND	ND
PCB-1254 (µg/kg)		ND	ND
PCB-1260 (µg/kg)		13000	4800

Table 2-22. Metal and PCB concentrations, and radionuclides in opossum and raccoon muscle 2000 (CDM 2000).

Analyte	Organism Sampled		
	Opossum Muscle	Raccoon 1 Muscle	Raccoon 2 Muscle
Aluminum (mg/kg)	18.2	2.04	20.5[a]
Antimony (mg/kg)	ND	ND	ND
Barium (mg/kg)	0.232	ND	ND
Beryllium (mg/kg)	0.0191	ND	ND
Cadmium (mg/kg)	ND	ND	ND
Chromium (mg/kg)	ND	ND	ND
Cobalt (mg/kg)	ND	ND	ND
Copper (mg/kg)	1.67	1.91	3.37
Iron (mg/kg)	53.4[a]	48.4[j]	71[a]
Lead (mg/kg)	ND	ND	ND
Manganese (mg/kg)	0.667	0.357	0.444
Nickel (mg/kg)	1.04	ND	ND
Silver (mg/kg)	ND	ND	ND
Thallium (mg/kg)	ND	ND	ND
Vanadium (mg/kg)	ND	ND	ND
Zinc (mg/kg)	53.1	41.9	60.5[a]
Arsenic (mg/kg)	ND	ND	ND
Mercury (mg/kg)	0.047[a]	0.025[n]	0.051[a]
Selenium (mg/kg)	ND	ND	ND
Uranium (pCi/g)	ND	ND	ND
Technetium-99 (pCi/g)	ND	ND	ND
Cesium-137 (pCi/g)	ND	ND	ND
Neptunium-237 (pCi/g)	ND	ND	ND
Plutonium-239/240 (pCi/g)	ND	ND	ND
Uranium-234 (pCi/g)	ND	ND	ND
Uranium-235 (pCi/g)	ND	ND	ND
Uranium-238 (pCi/g)	ND	ND	ND
Thorium-230 (pCi/g)	ND	ND	0.029
Americium-241 (pCi/g)	ND	ND	ND
Cobalt-60 (pCi/g)	ND	ND	ND
Neptunium-237 (pCi/g)	ND	ND	ND

j: estimated value
n: one or more samples with blanks not within control limits

Table 2-23. Mean of detectible (number of detects) contaminant concentrations in kidney tissue of mammals collected from the scrap metal site (OREIS 2001).

	Species			
	Raccoon	**Opossum**	**Bobcat**	**Groundhog**
Al (mg/kg)	5.61 (n=4)		6.25 (n=2)	
Sb (mg/kg)	ND (n=0)		ND (n=0)	
As (mg/kg)	0.010 (n=2)		0.0580 (n=2)	
Ba (mg/kg)	0.11560^{n} (n=2)		0.239 (n=1)	
Be (mg/kg)	ND (n=0)		ND (n=0)	
Cd (mg/kg)	1.05 (n=4)		0.266 (n=2)	
Cr (mg/kg)	0.308^{n} (n=4)		0.678 (n=2)	
Co (mg/kg)	ND (n=0)		ND (n=0)	
Cu (mg/kg)	6.65 (n=4)		3.75 (n=2)	
Fe (mg/kg)	113 (n=4)		89.2 (n=2)	
Pb (mg/kg)	0.491 (n=4)		0.0842 (n=2)	
Mn (mg/kg)	0.923 (n=4)		1.14 (n=2)	
Hg (mg/kg)	0.104 (n=4)		0.0825 (n=2)	
Ni (mg/kg)	1.22^{n} (n=4)		0.703 (n=2)	
Se (mg/kg)	1.34 (n=4)		1.32 (n=2)	
Ag (mg/kg)	ND (n=0)		ND (n=0)	
Sr (mg/kg)	0.239 (n=4)		0.280 (n=2)	
Tl (mg/kg)	0.305 (n=1)		ND (n=0)	
U (mg/kg)	0.987 (n=4)		0.260 (n=2)	
V (mg/kg)	0.148 (n=2)		ND (n=0)	
Zn (mg/kg)	20.2^{n} (n=4)		19.0 (n=2)	
^{137}Cs (pCi/g)	ND (n=0)		ND (n=0)	
^{212}Pb (pCi/g)	0.509 (n=1)			
^{237}Np (pCi/g)	ND (n=0)		ND (n=0)	
^{239}Pu (pCi/g)	ND (n=0)		ND (n=0)	
^{40}K (pCi/g)			ND (n=0)	ND (n=0)
^{99}Tc (pCi/g)	33.9 (n=1)		1.9 (n=1)	
^{228}Th (pCi/g)		1.23 (n=2)	0.710 (n=2)	
^{230}Th (pCi/g)	ND (n=0)		ND (n=0)	
^{234}Th (pCi/g)			6.77 (n=1)	
^{234}U (pCi/g)	ND (n=0)	ND (n=0)	ND (n=0)	
^{235}U (pCi/g)		0.948 (n=1)	0.0037 (n=1)	
^{238}U (pCi/g)	0.354 (n=1)	ND (n=0)	0.0740 (n=2)	
n: One or more samples had sample spike recoveries not within control limits				

Table 12-24. Mean of detectible (number of detects) contaminant concentrations in liver tissue of mammals collected from the scrap metal site (OREIS 2001).

Analyte	Mammal Sampled				
	Raccoon	**Opossum**	**Bobcat**	**Groundhog**	**Cottontail**
Al (mg/kg)	5.69 (n=5)		5.47 (n=2)		
Sb (mg/kg)	0.557 (n=1)		ND (n=0)		
As (mg/kg)	0.0306 (n=5)		0.115 (n=2)		
Ba (mg/kg)	0.623^{n} (n=1)		ND (n=0)		
Be (mg/kg)	ND (n=0)		ND (n=0)		
Cd (mg/kg)	0.520 (n=5)		0.132 (n=2)		
Cr (mg/kg)	2.32^{n} (n=5)		0.352 (n=1)		
Co (mg/kg)	0.582 (n=1)		ND (n=0)		
Cu (mg/kg)	12.9 (n=5)		6.21 (n=2)		
Fe (mg/kg)	862 (n=5)		224 (n=2)		
Pb (mg/kg)	0.905 (n=5)		0.0468 (n=2)		
Mn (mg/kg)	3.37 (n=5)		3.98 (n=2)		
Hg (mg/kg)	0.176^{n} (n=5)		0.0446 (n=2)		
Ni (mg/kg)	3.70^{n} (n=5)		0.257 (n=1)		
Se (mg/kg)	0.847^{n} (n=5)		0.821 (n=2)		
Ag (mg/kg)	ND (n=0)		ND (n=0)		
Sr (mg/kg)	0.119 (n=4)		ND (n=0)		
Tl (mg/kg)	ND (n=0)		ND (n=0)		
U (mg/kg)	0.177 (n=5)		0.0694 (n=2)		
V (mg/kg)	0.612 (n=5)		ND (n=0)		
Zn (mg/kg)	41.1^{n} (n=5)		31.7 (n=2)		
^{137}Cs (pCi/g)	ND (n=0)		ND (n=0)		
^{212}Pb (pCi/g)					0.439 (n=1)
^{214}Pb (pCi/g)	0.808 (n=1)				
^{237}Np (pCi/g)	ND (n=0)		ND (n=0)		
^{239}Pu (pCi/g)	ND (n=0)		ND (n=0)		
^{40}K (pCi/g)	4.18 (n=4)	5.61 (n=1)	8.94 (n=1)	13.8 (n=1)	5.04 (n=1)
^{99}Tc (pCi/g)	27 (n=1)		ND (n=0)		
^{228}Th (pCi/g)	0.320 (n=2)	0.346 (n=1)			
^{230}Th (pCi/g)	ND (n=0)		ND (n=0)		
^{234}Th (pCi/g)	2.46 (n=1)		6.09 (n=1)		
^{234}U (pCi/g)	ND (n=0)		13.6 (n=1)		
^{235}U (pCi/g)	0.0017 (n=1)		0.591 (n=1)		
^{238}U (pCi/g)	4.1 (n=2)		3.6 (n=4)		
PCB-1016 (µg/kg)	ND (n=0)		ND (n=0)		
PCB-1221 (µg/kg)	ND (n=0)		ND (n=0)		
PCB-1232 (µg/kg)	ND (n=0)		ND (n=0)		
PCB-1242 (µg/kg)	ND (n=0)		ND (n=0)		
PCB-1248 (µg/kg)	ND (n=0)		ND (n=0)		
PCB-1254 (µg/kg)	ND (n=0)		ND (n=0)		
PCB-1260 (µg/kg)	1418 (n=5)		2122 (n=2)		

Table 2-24. Continued.

Analyte	Mammal Sampled				
	Raccoon	Opossum	Bobcat	Groundhog	Cottontail
PCB101 (µg/kg)	2.72[p] (n=4)				
PCB118 (µg/kg)	6.14[p] (n=4)				
PCB126 (µg/kg)	ND (n=0)				
PCB128 (µg/kg)	4.38 (n=1)				
PCB138 (µg/kg)	23.6[p] (n=4)				
PCB153 (µg/kg)	40.2 (n=5)				
PCB170 (µg/kg)	23.4[p] (n=3)				
PCB180 (µg/kg)	159.1[p] (n=5)				
PCB187 (µg/kg)	12.4 (n=5)				
PCB194 (µg/kg)	34.7 (n=5)				
PCB66 (µg/kg)	1.13[p] (n=4)				
PCB77 (µg/kg)	ND (n=0)				
n: One or more samples had sample spike recoveries not within control limits					
p: One or more samples had >25% difference between two columns					

Table 2-25. Mean of detectible (number of detects) Aroclor and PCB contaminant concentrations in fat tissues of mammals collected from the scrap metal site (OREIS 2001).

Aroclor/Congener	Mammal Sampled	
	Raccoon	Bobcat
PCB-1016 (µg/kg)	ND (n=0)	ND (n=0)
PCB-1221 (µg/kg)	ND (n=0)	ND (n=0)
PCB-1232 (µg/kg)	ND (n=0)	ND (n=0)
PCB-1242 (µg/kg)	ND (n=0)	ND (n=0)
PCB-1248 (µg/kg)	ND (n=0)	ND (n=0)
PCB-1254 (µg/kg)	ND (n=0)	ND (n=0)
PCB-1260 (µg/kg)	2382 (n=4)	33535 (n=2)
PCB-1268 (µg/kg)	ND (n=0)	ND (n=0)
PCB101 (µg/kg)	24.7[p] (n=2)	
PCB118 (µg/kg)	1012 (n=4)	
PCB126 (µg/kg)	ND (n=0)	
PCB128 (µg/kg)	13.4 (n=4)	
PCB138 (µg/kg)	139 (n=2)	
PCB153 (µg/kg)	1160 (n=4)	
PCB170 (µg/kg)	754 (n=4)	
PCB180 (µg/kg)	1620 (n=4)	
PCB187 (µg/kg)	10.0 (n=4)	
PCB194 (µg/kg)	606 (n=4)	
PCB66 (µg/kg)	30.4[p] (n=1)	
PCB77 (µg/kg)	ND (n=0)	
p: One or more samples had >25% difference between two columns		

Table 2-26. Brain Aroclor concentrations measured in a bobcat collected from the scrap metal site (OREIS 2001).

Aroclor (µg/kg)	Bobcat Brain Tissue Concentration
PCB-1016	ND
PCB-1221	ND
PCB-1232	ND
PCB-1242	ND
PCB-1248	ND
PCB-1254	ND
PCB-1260	35.2
PCB-1268	ND

Table 2-27. Mean of detected concentrations (number of detects) and range of PCB congeners in PGDP raccoon liver, brain, necropsy fat, and biopsy fat 1998 (Texas Tech 1999).

	Congener Concentrations							
Congener*	**Liver Mean (Detects)**	**Liver Range**	**Brain Mean (Detects)**	**Brain Range**	**Necrop Fat Mean (Detects)**	**Necrop Fat Range**	**Biopsy Fat Mean (Detects)**	**Biopsy Fat Range**
101 (ppm)	(0)	ND-ND	(0)	ND-ND	0.022 (11)	ND-0.041	0.071 (18)	ND-0.135
118 (ppm)	0.018 (3)	ND-0.025	0.009 (1)	ND-0.009	0.147 (15)	0.009-0.502	0.212 (21)	ND-0.744
153 (ppm)	0.024 (8)	ND-0.043	0.028 (6)	ND-0.081	0.572 (15)	0.053-1.474	0.841 (25)	0.043-7.814
138 (ppm)	0.024 (11)	ND-0.047	0.033 (4)	ND-0.074	0.261 (15)	0.026-0.871	0.347 (24)	ND-2.638
187 (ppm)	0.025 (5)	0.011-0.047	(0)	ND-ND	0.040 (15)	0.009-0.124	0.109 (14)	ND-0.474
128 (ppm)	(0)	ND-ND	(0)	ND-ND	0.027 (12)	ND-0.065	0.053 (10)	ND-0.102
180 (ppm)	0.035 (10)	ND-0.128	0.038 (5)	ND-0.108	0.606 (15)	0.041-2.859	1.29 (25)	0.035-15.729
170 (ppm)	0.028 (5)	ND-0.071	0.081 (1)	ND-0.081	0.213 (15)	0.017-1.115	0.543 (23)	ND-5.683
194 (ppm)	0.030 (7)	ND-0.069	(0)	ND-ND	0.198 (15)	0.015-0.845	0.517 (24)	ND-6.292
66 (ppm)	(0)	ND-ND	(0)	ND-ND	0.034 (1)	ND-0.034	0.130 (3)	ND-0.170
77 (ppm)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
126 (ppm)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
169 (ppm)	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND	(0)	ND-ND
Total PCBs (ppm)	0.102 (13)	ND-0.370	0.097 (6)	ND-0.344	2.250 (15)	0.244-7.354	3.79 (25)	0.116-39.543
*** Congener values are on a wet weight basis**								

Table 2-28. Mean metal concentrations calculated from kidney tissue with detectable concentrations (number of detects) that were collected from PGDP raccoons 1998 (Texas Tech 1999)

Metal[a]	Metal Concentrations	
	Kidney Mean (Detects)	**Kidney Range**
Aluminum (mg/kg)	2.7*[n] (14)	ND-3.7
Antimony (mg/kg)	(0)	ND-ND
Barium (mg/kg)	0.42 (1)	ND-0.42
Beryllium (mg/kg)	0.02 (3)	ND-0.02
Cadmium (mg/kg)	2.5 (15)	0.52-4.6
Chromium (mg/kg)	1.6 (1)	ND-1.6
Cobalt (mg/kg)	(0)	ND-ND
Copper (mg/kg)	5.3 (15)	2.9-7.7
Iron (mg/kg)	89.4*[n] (15)	53.0-116
Lead (mg/kg)	2.6 (1)	ND-2.6
Manganese (mg/kg)	1.3 (15)	0.74-2.5
Nickel (mg/kg)	1.3 (1)	ND-1.3
Silver (mg/kg)	3.7*[n] (4)	0.5-7.7
Thallium (mg/kg)	4.4 (6)	ND-5.4
Uranium (µg/kg)	2.6 (3)	ND-5.4
Vanadium (mg/kg)	0.38 (8)	ND-0.69
Zinc (mg/kg)	21.1 (15)	14.4-29.4

[a]no indication was given whether metal values are on a wet weight or dry weight basis
***one or more samples had duplicate analysis not within control limits**
[n]one or more samples had spike recoveries not within control limits

Table 2-29. Contaminant concentrations measured in a red-tailed hawk liver 1996 (Price and Birge 1998).

Analyte	Hawk Liver Concentration (ppm)
Arsenic (As)	<0.175
Calcium (Ca)	93.3
Copper (Cu)	7.72
Iron (Fe)	575
Magnesium (Mg)	149
Manganese (Mn)	3.48
Mercury (Hg)	0.075
Molybdenum (Mb)	0.87
Nickel (Ni)	1.96
Potassium (K)	1740
Selenium (Se)	1.01
Silver (Ag)	0.761
Sodium (Na)	1370
Thallium (Th)	<6.57
Vanadium (V)	0.652
Zinc (Zn)	26.5
Aroclor 1260	5.25
% Lipids	3.8

Table 2-30. Aroclor concentrations in red-tailed hawk blood samples collected during 1997 (Price and Birge 1998).

	Aroclor Concentration (µg/mL)		
Sample Number	**1248**	**1254**	**1260**
1	<0.020	<0.020	0.67
1	<0.020	<0.020	0.76
2	<0.020	<0.020	<0.020
3	<0.020	<0.020	0.09
4	<0.020	<0.020	0.06
Sample #1 was analyzed in July of 1997 and redone in October of 1997			

Table 2-31. Aroclor concentrations in a road killed mink collected in 1997 (Price and Birge 1998).

	Aroclor Concentration (mg/kg)		
Mink Tissue Sample	**1248**	**1254**	**1260**
Liver	<0.187	<0.187	1.1
Kidney	<0.228	<0.228	0.53

Table 2-32. Metal concentrations in two river otter incidentally collected while trapping beaver near the PGDP in 2000 (Halbrook 2000).

	Liver		Kidney	
Metal (mg/kg)	**PD001**	**PD002**	**PD001**	**PD002**
Silver	4.84	0.15	0.34	0.22
Aluminum	93.64	142.2	21.62	25.38
Arsenic	<1.734	<1.734	<1.734	<1.734
Barium	53.38	4.79	0.41	0.398
Beryllium	<0.025	<0.025	0.047	<0.025
Cadmium	<0.046	0.18	<0.046	0.233
Cobalt	0.038	0.02	0.022	0.016
Chromium	<0.384	0.518	<0.384	<0.384
Copper	11.92	64.1	1.48	1.18
Iron	99.63	107.1	49.15	43.65
Magnesium	131.1	110.4	87.75	85.62
Nickel	0.93	0.46	0.391	0.41
Lead	4.85	2.52	1.51	1.5
Antimony	<0.012	<0.012	<0.012	<0.012
Selenium	0.337	0.31	0.42	0.73
Titanium	<0.001	<0.001	<0.001	0.005
Vanadium	<0.110	<0.110	<0.110	<0.110
Zinc	23.47	24.73	12.14	12.04
Mercury	1.38	0.98		
	Hair			
Mercury	15.92	8.93		

Table 2-33. Aroclor 1260 and PCB congener concentrations measured in two river otter incidentally collected while trapping beaver near the PGDP in 2000 (Halbrook 2000).

	Liver		Fat	
	PD001	**PD002**	**PD001**	**PD002**
Aroclor 1260 (mg/kg)	2.47	4.75	13.94	32.48
non-ortho congeners (µg/kg)				
cb77	<DL	<DL	0.05	0.3
cb169	18.25	<DL	<DL	39.95
mono-ortho congeners (µg/kg)				
cb18	<DL	<DL	<DL	<DL
cb31	13.4	13.75	31.45	224.65
cb105	<DL	<DL	90.55	157.4
cb118	<DL	18.9	114.55	38.45
di-ortho congeners (µg/kg)				
cb40	<DL	<DL	<DL	15.95
cb44	<DL	<DL	<DL	59.1
cb49	18.05	16.9	42	57.75
cb52	18.35	23.15	100.3	212.25
cb87	14.25	14.55	58.3	171.75
cb99	77.4	91.75	617.7	1183.7
cb101	53.3	157.95	294.15	325.8
cb110	<DL	13.75	36.2	104.4
cb128	15.45	35.4	132.4	293.1
cb129	<DL	10.45	48.3	118.5
cb138	197.95	324.1	978.7	1688.95
cb153	188.75	359.35	1143.25	2152.05
cb170	106.85	141.35	614.1	893.6
cb180	212.25	385.15	1608.35	2928.35
tri-ortho congeners (µg/kg)				
cb151	141.7	87.95	17.8	157.65
cb183	26.45	65.85	204.55	479.45
cb201	57.85	80.25	203.2	450.6
cb203	39.15	87.85	262.85	607.75
cb185/167	<DL	<DL	<DL	<DL
cb156/200	69.7	<DL	32.95	82.45

Table 2-34. Metal concentrations measured in kidney (KID), liver (LIV), and fat (FAT) tissue from beaver collected near the PGDP (Birge and Price 2000).

Sample	Number*	Weight of Tissue	Metal Concentration (µg/g)							
			Ag	Be	Cd	Cr	Cu	Pb	Ni	Zn
BEAV#1	KID1	1.512	0.015	<0.13	2.06	0.14	3.70	0.57	0.75	20.94
BEAV#1	KID2	0.618	0.027	<0.32	3.78	1.05	6.57	1.00	1.26	51.38
BEAV#2	KID1	1.169	0.013	<0.17	1.71	<0.09	3.85	0.54	0.76	27.61
BEAV#2	KID2	1.107	0.009	<0.18	1.73	<0.09	4.25	0.53	0.71	10.31
BEAV#3	KID1	1.077	0.009	<0.19	1.63	0.81	3.76	0.53	0.81	11.37
BEAV#3	KID2	1.482	0.013	<0.13	1.55	0.50	4.59	0.60	0.87	20.54
	Mean	1.161	0.014	N.D.	2.08	0.66	4.45	0.63	0.86	23.69
BEAV#1	LIV1A	1.200	0.023	<0.17	0.22	0.10	3.75	0.58	0.78	10.42
BEAV#1	LIV1A	1.885	0.011	<0.11	0.24	0.15	3.62	0.55	0.87	17.97
BEAV#2	LIV1A	1.287	0.011	<0.16	0.11	0.09	3.47	0.59	0.90	23.64
BEAV#3	LIV1A	1.132	0.013	<0.18	0.11	<0.09	5.68	0.89	0.87	27.98
BEAV#3	LIV1B	1.50	0.004	<0.17	<0.09	0.14	0.94	<0.09	<0.26	2.05
	Mean	1.331	0.013	N.D.	0.17	0.12	3.50	0.65	0.85	16.41
BEAV#1	FAT1A	0.921	0.030	<0.22	0.12	0.15	4.86	0.77	1.00	2.39
BEAV#1	FAT1B	1.327	0.002	<0.15	<0.08	0.17	0.78	<0.08	<0.23	1.47
BEAV#2	FAT1A	2.956	0.005	<0.07	<0.03	0.07	0.61	<0.03	<0.10	1.12
BEAV#2	FAT1B	2.142	0.005	<0.09	<0.05	0.07	0.87	0.06	<0.14	1.98
BEAV#3	FAT1A	0.877	0.013	<0.23	<0.01	0.14	1.39	<0.11	<0.34	3.35
BEAV#3	FAT1B	1.916	0.002	<0.10	<0.05	0.06	0.45	<0.05	<0.16	0.73
	Mean	1.690	0.010	ND	0.12	0.11	1.49	0.42	1.00	1.84

*Samples designated 1 and 2 are separate samples, whereas samples A and B are duplicates from the same tissue sample

Table 2-35. Aroclor concentrations measured in kidney (KID), liver (LIV), and fat (FAT) tissue from beaver collected near the PGDP (Birge and Price 2000).

Name	Number	Weight of Organ	Weight of Tissue	Aroclor concentration (μg/g)			
				1248	1254	1260	Total
BEAV1	KID1	28.739	4.980	0.028	<0.016	0.006	0.034
BEAV1	KID2	26.188	3.845	0.032	<0.021	0.017	0.049
	Mean	27.464	4.413	0.030	N.D.	0.012	0.042
BEAV2	KID1	43.563	3.910	<0.020	<0.020	<0.020	<0.020
BEAV2	KID2	48.339	4.728	<0.017	<0.017	<0.017	<0.017
	Mean	45.951	4.319	N.D.	N.D.	N.D.	N.D.
BEAV3	KID1	46.815	4.624	<0.017	<0.017	<0.017	<0.017
BEAV3	KID2	47.393	6.591	<0.012	<0.012	<0.012	<0.012
	Mean	47.104	5.6075	N.D.	N.D.	N.D.	N.D.
BEAV1	LIVA	351.47	7.912	0.049	<0.010	0.010	0.059
BEAV1	LIVB		8.098	0.043	<0.010	0.008	0.051
	Mean	351.47	8.005	0.046	N.D.	0.009	0.055
BEAV2	LIVA	598.17	6.687	<0.012	<0.012	<0.012	<0.012
BEAV3	LIVA	532.50	7.053	<0.011	<0.011	<0.011	<0.011
BEAV3	LIVB		4.815	<0.017	<0.017	<0.017	<0.017
	Mean	532.50	5.934	N.D.	N.D.	N.D.	N.D.
BEAV1	FATA	21.641	2.949	0.773	<0.027	0.142	0.915
BEAV1	FATB		2.648	0.699	<0.030	0.160	0.859
	Mean	21.641	2.7985	0.736	N.D.	0.151	0.887
BEAV2	FATA	88.68	5.629	<0.028	<0.028	<0.028	<0.028
BEAV2	FATB		5.412	<0.030	<0.030	<0.030	<0.030
	Mean	88.68	5.5205	N.D.	N.D.	N.D.	N.D.
BEAV3	FATA	127.03	3.295	<0.024	<0.024	<0.024	<0.024
BEAV3	FATB		7.405	<0.011	0.018	<0.011	0.018
	Mean	127.03	5.35	N.D.	0.018	N.D.	0.018
*Samples designated 1 and 2 are separate samples, whereas samples A and B are duplicates from the same tissue sample							

Table 2-36. Metal concentrations measured in muscle tissue of six rabbits collected from the PGDP during 1998 (OREIS 1998).

	Metal Concentration (mg/kg)									
	Zn	**Fe**	**As**	**Hg**	**Se**	**Co**	**Pb**	**Tl**	**Sb**	**Ag**
Mean of Detects	9.4	13.5	ND	0.044	ND	ND	ND	ND	ND	5.0
Range of Detects	8.6-10.6	10.3-16.1		0.036-0.048						5.0-5.0
	Ni	**Cu**	**Cr**	**Al**	**Be**	**Mn**	**Ba**	**Cd**	**V**	
Mean of Detects	ND	0.76	ND	ND	ND	0.09	ND	ND	ND	
Range of Detects		0.54-1.00				0.09-0.09				

Table 2-37. Radionuclides measured in muscle tissue of six rabbits collected from the PGDP during 1998 (OREIS 1998).

	Radionuclide Concentration (pCi/g)								
	^{99}Tc	**^{137}Cs**	**^{90}Sr**	**^{230Th}**	**$^{239/240}$Pu**	**^{234}U**	**^{235}U**	**^{238}U**	**^{237}Np**
Mean	ND	ND	ND	ND	ND	ND	ND	ND	ND
Range									

Table 2-38. Aroclor concentrations measured in fat and muscle tissue of six rabbits collected from the PGDP during 1998 (OREIS 1998).

	1232	1221	1016	1260	1254	1248	1242
Fat Mean of Detects	ND	ND	ND	ND	ND	ND	ND
Fat Range of Detects							
Muscle Mean of Detects	ND	ND	ND	ND	ND	ND	ND
Muscle Mean of Detects							

Table 2-39. Metal concentrations measured in muscle tissue of six rabbits collected from the PGDP during 1999 (OREIS 1999).

	Metal Concentration (mg/kg)									
	Zn	**Fe**	**As**	**Hg**	**Se**	**Co**	**Pb**	**Tl**	**Sb**	**Ag**
Mean of Detects (# detects)	12.4 (6)	16.8 (6)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Range of Detects	8.59-17.4	12.3-21.1	ND-ND	ND-ND	ND-ND	ND-ND	ND-ND	ND-ND	ND-ND	ND-ND
	Ni	**Cu**	**Cr**	**Al**	**Be**	**Mn**	**Ba**	**Cd**	**V**	
Mean of Detects (# detects)	(0)	0.781 (6)	(0)	2.49 (4)	(0)	0.288 (6)	(0)	(0)	(0)	
Range of Detects	ND-ND	0.330-0.997	ND-ND	ND-2.92	ND-ND	0.167-0.450	ND-ND	ND-ND	ND-ND	

Table 2-40. Radionuclides measured in muscle tissue of six rabbits collected from the PGDP during 1999 (OREIS 1999).

	Radionuclide Concentration (pCi/g)								
	^{137}Cs	**^{237}Np**	**$^{239/240}$Pu**	**^{90}Sr**	**^{99}Tc**	**^{230}Th**	**^{234}U**	**^{235}U**	**^{238}U**
Mean of Detects (# of detects)	(0)	(0)	(0)	(0)	(0)	(0)	0.012 (1)	(0)	(0)
Range of Detects	ND-ND	ND-ND	ND-ND	ND-ND	ND-ND	ND-ND	ND-0.012	ND-ND	ND-ND

Table 2-41. Aroclor concentrations measured in fat tissue of six rabbits collected from the PGDP during 1999 (OREIS 1999).

	Aroclor Concentration (µg/kg)						
	1016	**1221**	**1232**	**1242**	**1248**	**1254**	**1260**
Mean of Detects (# of detects)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Range of Detects	ND-ND	ND-ND	ND-ND	ND-ND	ND-ND	ND-ND	ND-ND

Table 2-42. Metal concentrations (µg/g wet weight) measured in kidney tissue from amphibians collected at the PGDP (DeGarady 2002).

	Pb		Cd		Cr		Cu		Al		Fe	
Outfall	mean	detect/ analyzed	mean	detect/ analyzed	mean	detect/ analyzed	mean	detect/ analyzed	mean	detect/ analyzed	mean	detect/ analyzed
001	ND	0/6	0.22	3/6	0.06	1/6	2.14	6/6	0.76	3/6	167	6/6
002	ND	0/1	0.19	1/1	0.30	1/1	1.48	1/1	ND	0/1	89.0	1/1
008	0.70	1/3	0.39	2/3	0.07	1/3	2.35	2/3	1.46	3/3	131	3/3
009	0.72	2/5	0.37	4/5	0.11	2/5	2.05	5/5	0.86	3/5	198	5/5
012	ND	0/7	0.17	4/7	0.07	3/7	1.98	5/7	0.41	4/7	149	7/7
013	0.62	1/3	0.11	1/3	ND	0/3	1.78	2/3	0.41	2/3	125	3/3

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