Ecological Soil Screening Levels for Lead

Interim Final

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1.0 INTRODUCTION

Ecological Soil Screening Levels (Eco-SSLs) are concentrations of contaminants in soil that are protective of ecological receptors that commonly come into contact with and/or consume biota that live in or on soil. Eco-SSLs are derived separately for four groups of ecological receptors: plants, soil invertebrates, birds, and mammals. As such, these values are presumed to provide adequate protection of terrestrial ecosystems. Eco-SSLs are derived to be protective of the conservative end of the exposure and effects species distribution, and are intended to be applied at the screening stage of an ecological risk assessment. These screening levels should be used to identify the contaminants of potential concern (COPCs) that require further evaluation in the site-specific baseline ecological risk assessment that is completed according to specific guidance (U.S. EPA, 1997, 1998, and 1999). The Eco-SSLs are not designed to be used as cleanup levels and the United States (U.S.) Environmental Protection Agency (EPA) emphasizes that it would be inappropriate to adopt or modify the intended use of these Eco-SSLs as national cleanup standards.

The detailed procedures used to derive Eco-SSL values are described in separate documentation (U.S. EPA, 2003). The derivation procedures represent the collaborative effort of a multi-stakeholder team consisting of federal, state, consulting, industry, and academic participants led by the U.S. EPA, Office of Solid Waste and Emergency Response.

This document provides the Eco-SSL values for lead and the documentation for their derivation. This document provides guidance and is designed to communicate national policy on identifying lead concentrations in soil that may present an unacceptable ecological risk to terrestrial receptors. The document does not, however, substitute for EPA's statutes or regulations, nor is it a regulation itself. Thus, it does not impose legally-binding requirements on EPA, states, or the regulated community, and may not apply to a particular situation based upon the circumstances of the site. EPA may change this guidance in the future, as appropriate. EPA and state personnel may use and accept other technically sound approaches, either on their own initiative, or at the suggestion of potentially responsible parties, or other interested parties. Therefore, interested parties are free to raise questions and objections about the substance of this document and the appropriateness of the application of this document to a particular situation. EPA welcomes public comments on this document at any time and may consider such comments in future revisions of this document.

2.0 SUMMARY OF ECO-SSLs FOR LEAD

Lead is a naturally occurring element which can be found in all environmental media: air, soil, sediment, and water. The extent of occurrence of lead in the earth's crust is about 15 g/ton, or 0.002%. Lead occurs chiefly as a sulfide in galena. Other lead minerals include anglesite ($PbSO_4$), cerussite ($PbCO_3$), mimetite ($PbCl_2$C3$Pb_3(AsO_4)_2$), and pyromorphite [$PbCl_2$ C3$Pb_3(PO_4)_2$)] (Budavari, 1996). Lead is released to the environment from coal-fired power

plants, ceramic manufacturing, mining, ore processing, smelting of lead ores, refining, the production and use of lead alloys and compounds, recycling, combustion processes, industrial processes, and from disposal. Lead may also be deposited on land as slag, dust, sludge, and water treatment residues from manufacturing and waste treatment processes (NRCC, 1978, U.S. EPA, 1979).

Lead in soil is relatively immobile and persistent whether added to the soil as halides, hydroxides, oxides, carbonates, or sulfates (U.S. EPA, 1979). When released to soil, lead is normally converted from soluble lead compounds to relatively insoluble sulfate or phosphate derivatives. It also forms complexes with organic matter and clay minerals which limits its mobility. The efficient fixation of lead in soils limits the transfer of lead to aquatic systems. However, leaching of lead can be relatively rapid from some soils, especially at highly contaminated sites or landfills (Kayser et al., 1982). Lead is most available from acidic sandy soils which contain little material capable of binding lead (NRCC, 1978). Concentrations of lead in soil solution reach a minimum between pH 5 and 6 because metal-organic complexes form in this pH range. Only a small fraction of lead in lead-contaminated soil appears to be in water-soluble form (0.2-1%) (http://toxnet.nlm.nih.gov). The uptake of lead by plants also depends on other factors including cation exchange capacity, soil composition (e.g., organic matter content, calcium content), metal concentrations, precipitation, light, and temperature. Lead uptake by plants is favored at lower pH values and in soils with low organic carbon content (DeMayo et al, 1982).

Lead may also be found in soils as stable organic compounds or metallic lead or lead alloys from the use of lead shot or fishing weights. The Eco-SSLs are derived for the inorganic forms of lead found in soils and are not derived for either organic lead compounds or metallic lead shot. If these waste sources are suspected to be present or are present, then a site-specific evaluation of risks associated with these forms of lead will be required outside of the use of the Eco-SSL values.

Lead is not considered to be an essential element for plant growth and development. Lead inhibits growth, reduces photosynthesis (by inhibiting enzymes unique to photosynthesis), interferes with cell division and respiration, reduces water absorption and transpiration, accelerates abscission or defoliation and pigmentation, and reduces chlorophyll and ATP synthesis (U.S. EPA, 1979).

Lead is also not considered an essential element for birds or mammals. Clinical signs of lead toxicity in domestic animals are manifested differently for different species, but the overall signs are of encephalopathy preceded and accompanied by gastrointestinal malfunction (Booth and MacDonald, 1982). Behavorial signs of poisoning include anxiety, apprehension, hyperexcitability, vocalization, rolling of eyes, apparent fear or terror, possible belligerence, pressing of the head against a wall or post, attempts to climb a wall, sudden jumping into the air, frenzied or manical behavior (Booth and MacDonald, 1982). Locomotor disturbances of lead poisoning range from a stiff, stilted gait with ataxia and incoordination to rigidity of all postural muscles, swaying, and posterior weakness to compulsive hypermotility (circling, pacing, running). (Booth and MacDonald, 1982).

Lead can interfere with the synthesis of heme, thereby altering the urinary or blood concentration of enzymes and intermediates in heme synthesis or their derivatives. Thus, lead poisoning can lead to accumulation of non-heme iron and protoporphyrin-IX in red cells, an increase in delta-aminolevulinic acid (ALA) in blood and urine, an increase in urinary coproporphyrin, proporphyrin, and porphobilinogen, inhibition of blood ALA-dehydratase (ALA-D), and an increased proportion of immature red cells in the blood (reticulocytes and basophilic stippled cells (NIOSH, 1978). One of the characteristic cellular metabolic reactions in lead intoxication is the formation of intranuclear inclusion bodies, a discrete, dense-staining mass found in the liver parenchyma and in the tubular lining cells of the kidney (Clayton and Clayton, 1994). The intranuclear inclusion bodies are a lead protein complex that may have adaptive function in excessive lead exposure (NIOSH, 1978). Other signs of lead poisoning in domestic animals include rapid labored breathing, anorexia, weight loss, decreased milk production, dehydration, emaciation, fetal death with either resorption or abortion of the fetus, general weakness (Booth and MacDonald, 1982), paraplegia (WHO, 1977), mortality and impaired postnatal growth (Rattner et al., 1975), reduced pregnancy rate (Kennedy et al., 1975), and interference with resistance to infectious disease (Gainer, 1974) (http://toxnet.nlm.nih.gov).

The Eco-SSL values derived to date for lead are summarized in Table 2.1.

Table 2.1 Lead Eco-SSLs (mg/kg dry weight in soil)

Plants	Soil Invertebrates	Wildlife	
		Avian	Mammalian
120	1,700	11	56

Eco-SSL values for lead were derived for all receptor groups. The Eco-SSLs range from 11 mg/kg dry weight (dw) for avian wildlife to 1,700 mg/kg dw for soil invertebrates. The Eco-SSL values for lead for plants, soil invertebrates, and mammalian wildlife are higher than the 95th percentiles of reported background concentrations for both eastern and western U.S. soils (Figure 2.1) (at 38 and 32 mg/kg, respectively. The Eco-SSL value for lead for avian wildlife is, however, lower than the 50th percentile for reported background concentrations in eastern and western U.S. soils (Figure 2.1). Background concentrations reported for many metals in U.S. soils are described in Attachment 1-4 of the Eco-SSL guidance (U.S. EPA, 2003).

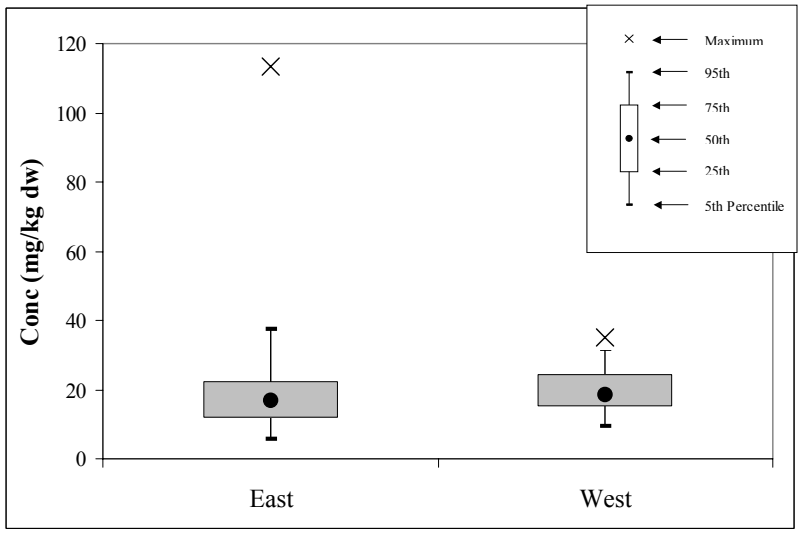


Figure 2.1 Typical Background Concentrations of Lead in U.S. Soils

3.0 ECO-SSL FOR TERRESTRIAL PLANTS

Of the papers identified from the literature search process, 439 were selected for acquisition for further review. Of those papers acquired, 28 met all 11 Study Acceptance Criteria (U.S. EPA, 2003; Attachment 3-1). Each of these papers were reviewed and the studies were scored according to the Eco-SSL guidance (U.S. EPA, 2003; Attachment 3-2). Thirty studies received an Evaluation Score greater than ten. These studies are listed in Table 3.1.

The data in Table 3.1 are sorted by bioavailability score. There are eleven studies eligible for Eco-SSL derivation. There are four studies eligible for Eco-SSL derivation with a bioavailability score of 2 and all were used to derive the plant Eco-SSL for lead (U.S. EPA, 2003; Attachment 3-2). The Eco-SSL is the geometric mean of the maximum acceptable toxicant concentration (MATC) values for four test species under three different test conditions (pH and % organic matter (OM)) and is equal to 120 mg/kg dw.

4.0 ECO-SSL FOR SOIL INVERTEBRATES

Of the papers identified from the literature search process, 179 were selected for acquisition for further review. Of those papers acquired, 13 met all 11 Study Acceptance Criteria (U.S. EPA, 2003; Attachment 3-1). Each of these papers were reviewed and the studies were scored according to the Eco-SSL guidance (U.S. EPA, 2003; Attachment 3-2). Eighteen studies received an Evaluation Score greater than ten. These studies are listed in Table 4.1.

The data in Table 4.1 are sorted by bioavailability score. There are four studies eligible for Eco-SSL derivation and all were used to derive the soil invertebrate Eco-SSL for lead (U.S. EPA, 2003; Attachment 3-2). The Eco-SSL is the geometric mean of the MATC values for one test species under three different test conditions (pH) and is equal to 1,700 mg/kg dw.

5.0 ECO-SSL FOR AVIAN WILDLIFE

The derivation of the Eco-SSL for avian wildlife was completed as two parts. First, the toxicity reference values (TRV) was derived according to the Eco-SSL guidance (U.S. EPA, 2003; Attachment 4-5). Second, the Eco-SSL (soil concentration) was back-calculated for each of three surrogate species based on the wildlife exposure model and the TRV (U.S. EPA, 2003).

5.1 Avian TRV

The literature search completed according to the Eco-SSL guidance (U.S. EPA, 2003; Attachment 4-2) identified 2,429 papers with possible toxicity data for lead for either avian or mammalian species. Of these papers, 2,157 were rejected for use as described in Section 7.5. Of the remaining papers, 54 contained data for avian test species. These papers were reviewed and the data were extracted and scored according to the Eco-SSL guidance (U.S. EPA, 2003; Attachment 4-3 and 4-4). The results of the data extraction and review are summarized in Table 5.1. The complete results are included as Appendix 5-1.

Table 3.1 Plant Toxicity Data - Lead

Reference	Study ID	Test Organism		Soil pH	OM %	Bio-availability Score	ERE	Tox Parameter	Tox Value (Soil Conc. mg/kg dw)	Total Evaluation Score	Eligible for Eco-SSL Derivation?	Used for Eco-SSL?
Davis and Barnes, 1973	a	Loblolly pine	*Pinus taeda*	4	2.5	2	GRO	MATC	144	12	Y	Y
Davis and Barnes, 1973	b	Red maple	*Acer rubrum*	4	2.5	2	GRO	MATC	144	12	Y	Y
Marques Dos Santos et al., 1993	b	Berseem clover	*Trifolium alexandrium*	6.3	0.94	2	GRO	MATC	316	14	Y	Y
Marques Dos Santos et al., 1993	a	Berseem clover	*Trifolium alexandrium*	6.7	3.11	1	GRO	MATC	141	13	Y	N
Singh and Jeng, 1993		Ryegrass	*Lolium rigidum*	5.6	0.1	2	GRO	MATC	22	14	Y	Y
								Geometric Mean	115			
Data Not Used to Derive Eco-SSL												
Chappelka et al., 1991		Loblolly pine	*Pinus taeda*	5.5	3.4	2	GRO	NOAEC	480	12	N	N
Dixon, 1988		Red Oak	*Querus rubras*	6	1.5	2	GRO	LOAEC	100	19	N	N
Gaweda, 1991	a	Spinach	*Spinacia oleracea*	6.7	0.0	2	GRO	NOAEC	600	14	N	N
Taylor, 1974		Alfalfa	*Medicago sativa*	6.4	1.0	2	GRO	NOAEC	250	11	N	N
Taylor and Allinson, 1981	h	Alfalfa	*Medicago sativa*	6.9	1.7	2	GRO	NOAEC	250	15	N	N
Taylor and Allinson, 1981	I	Alfalfa	*Medicago sativa*	6.9	1.7	2	GRO	NOAEC	250	15	N	N
Zaman and Zereen, 1998	a	Radish	*Raphanus sativus*	6.9	1.0	2	GRO, BIO	LOAEC	500	14	N	N
Zaman and Zereen, 1998	b	Radish	*Raphanus sativus*	6.9	1.0	2	GRO	LOAEC	100	14	N	N
Zaman and Zereen, 1998	c	Radish	*Raphanus sativus*	6.9	1.0	2	GRO	LOAEC	100	14	N	N
Balba et al., 1991	b	Tomato	*Lycopersicum esculentum*	7.73	1.70	1	REP	MATC	71	15	Y	N
Balba et al., 1991	c	Tomato	*Lycopersicum esculentum*	8.20	0.86	1	REP	MATC	71	15	Y	N
Dang et al., 1990	g	Fenugreek	*Trigonella foenum*	8.3	0.5	1	GRO	MATC	283	11	Y	N
Gaweda, 1991	b	Spinach	*Spinacia oleracea*	6.7	3.0	1	GRO	MATC	424	13	Y	N
Hassett et al., 1976		Corn	*Zea mays*	6.5	2.1	1	GRO	MATC	158	15	Y	N
Xiong, 1997		Sow thistle	*Sonchous oleraceus* L.	7.23	1.6	1	GRO	MATC	2263	14	Y	N
Dang et al., 1990	d	Onion	*Allium cepa*	8.3	0.5	1	GRO	LOAEC	50	11	N	N
Gaweda and Capecka, 1995	a	Radish	*Raphanus sativus*	5.1	8.0	1	GRO	NOAEC	600	13	N	N
Kadar and Morvai, 1998	a	Carrot	*Daucus carota*	7.0	0.6	1	GRO	NOAEC	85	11	N	N
Kadar and Morvai, 1998	b	Peas	*Pisum sativum*	7.0	0.6	1	GRO	NOAEC	85	11	N	N
Patel et al., 1977		Barley	*Hordeum vulgare*	6.0	2.5	1	GRO	NOAEC	1000	12	N	N
Taylor and Allinson, 1981	g	Alfalfa	*Medicago sativa*	6.9	4.8	1	GRO	NOAEC	250	14	N	N
Balba et al., 1991	a	Tomato	*Lycopersicum esculentum*	7.45	2.06	0	REP	MATC	35	14	N	N
Gaweda, 1991	c	Spinach	*Spinacia oleracea*	6.7	8.0	0	GRO	NOAEC	600	12	N	N
Gaweda and Capecka, 1995	b	Radish	*Raphanus sativus*	6.2	8.0	0	GRO	NOAEC	600	13	N	N
Gaweda and Capecka, 1995	c	Radish	*Raphanus sativus*	7.1	8.0	0	GRO	NOAEC	600	13	N	N

BIO = Biomass
ERE = Ecologically relevant endpoint
GRO = Growth
LOAEC = Lowest observed adverse effect concentration
MATC = Maximum acceptable toxicant concentration. Geometric mean of NOAEC and LOAEC.
N = No
REP = Reproduction
NOAEC = No observed adverse effect concentration
OM = Organic matter content
Y = Yes
Bioavailability Score described in *Guidance for Developing Eco-SSLs* (U.S. EPA, 2003)
Total Evaluation Score described in *Guidance for Developing Eco-SSLs* (U.S. EPA, 2003)

Table 4.1 Invertebrate Toxicity Data - Lead

Reference	Study ID	Test Organism		Soil pH	OM %	Bio-availability Score	ERE	Tox Parameter	Tox Value (Soil Conc. mg/kg dw)	Total Evaluation Score	Eligible for Eco-SSL Derivation?	Used for Eco-SSL?
Sandifer and Hopkin, 1996	a	Collembola	*Folsomia candida*	6.0	10.0	1	REP	MATC	3162	16	Y	Y
Sandifer and Hopkin, 1996	c	Collembola	*Folsomia candida*	4.5	10.0	1	REP	MATC	3162	16	Y	Y
Sandifer and Hopkin, 1996	b	Collembola	*Folsomia candida*	5.0	10.0	1	REP	MATC	894	15	Y	Y
Sandifer and Hopkin, 1997		Collembola	*Folsomia candida*	6.0	10.0	1	REP	MATC	894	15	Y	Y
								Geometric Mean	1682			
Data Not Used to Derive Eco-SSL												
Peredney and Williams, 2000b	s	Nematode	*Caenorhabditis elegans*	4	1.14	2	MOR	LC_{50}	285	13	N	N
Peredney and Williams, 2000b	t	Nematode	*Caenorhabditis elegans*	4	1.14	2	MOR	LC_{50}	297	13	N	N
Peredney and Williams, 2000b	u	Nematode	*Caenorhabditis elegans*	4	4.2	2	MOR	LC_{50}	847	13	N	N
Peredney and Williams, 2000b	v	Nematode	*Caenorhabditis elegans*	4	4.2	2	MOR	LC_{50}	1341	13	N	N
Donkin and Dusenbery, 1994	a	Nematode	*Caenorhabditis elegans*	6.2	1.7	2	MOR	LC_{50}	1554	14	N	N
Donkin and Dusenbery, 1994	b	Nematode	*Caenorhabditis elegans*	5.1	3.0	2	MOR	LC_{50}	891	14	N	N
Spurgeon et al., 1994		Earthworm	*Eisenia fetida*	6.3	10.0	1	REP	EC_{50}	1940	15	N	N
Spurgeon and Hopkin, 1995		Earthworm	*Eisenia fetida*	6.1	10.0	1	REP	EC_{50}	1629	15	N	N
Neuhauser et al., 1985a; 1985b	b	Earthworm	*Eisenia fetida*	6.0	10.0	1	MOR	LC_{50}	3716	13	N	N
Conder and Lanno, 2000		Earthworm	*Eisenia fetida*	6.5	10.0	1	MOR	ILL	1.16	16	N	N
Peredney and Williams, 2000a; 2000b	w	Nematode	*Caenorhabditis elegans*	4	10	1	MOR	LC_{50}	1434	12	N	N
Peredney and Williams, 2000b	x	Nematode	*Caenorhabditis elegans*	4	10	1	MOR	NOAEC	2235	12	N	N
Donkin and Dusenbery, 1994	c	Nematode	*Caenorhabditis elegans*	6.1	3.4	1	MOR	LC_{50}	13.9	13	N	N
Donkin and Dusenbery, 1994	d	Nematode	*Caenorhabditis elegans*	6.2	2.2	1	MOR	LC_{50}	11.6	13	N	N

EC_{50} = Effect concentration for 50% of test population
ERE = Ecologically relevant endpoint
ILL = Incipient lethal level
LC_{50} = Concentration lethal to 50% of test population
LOAEC = Lowest observed adverse effect concentration
OM = Organic matter content
REP = Reproduction
MATC = Maximum acceptable toxicant concentration = geometric mean of NOAEC and LOAEC
MOR = Mortality
N = No
NOAEC = No observed adverse effect concentration
Y = Yes
Bioavailability Score described in *Guidance for Developing Eco-SSLs* (USEPA, 2003)
Total Evaluation Score described in *Guidance for Developing Eco-SSLs* (USEPA, 2003)

Table 5.1 Avian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
Lead

Result #	Reference	Ref No.	Test Organism	# of Conc/ Doses	Method of Analyses	Route of Exposure	Exposure Duration	Duration Units	Age	Age Units	Lifestage	Sex	Effect Type	Effect Measure	Response Site	NOAEL Dose (mg/kg bw/day)	LOAEL Dose (mg/kg bw/day)	Data Evaluation Score
Biochemical																		
1	Scheuhammer, 1987	2860	Zebra finch (*Poephila guttata*)	7	U	FD	35	d	NR	NR	AD	M	ENZ	ALAD	BL	0.0584	0.292	69
2	Edens and Garlich, 1983	2608	Japanese quail (*Coturnix japonica*)	4	U	FD	5	w	6	w	JV	F	CHM	CALC	BL	0.194	1.94	68
3	Edens and Garlich, 1983	2608	Japanese quail (*Coturnix japonica*)	4	U	FD	5	w	6	d	JV	F	CHM	CALC	BL	0.194	1.94	70
4	Finley et al., 1976	2624	Mallard (*Anas platyrhynchos*)	4	M	FD	12	w	1	yr	AD	M	ENZ	ALAD	BL	0.201	0.586	78
5	Edens and Garlich, 1983	2608	Chicken (*Gallus domesticus*)	5	U	FD	2	w	NR	NR	AD	F	CHM	CALC	BL	6.24	12.5	72
6	Morgan et al., 1975	2779	Japanese quail (*Coturnix japonica*)	5	U	FD	5	w	6	d	JV	NR	CHM	HMGL	BL	12.6	126	69
7	Morgan et al., 1975	2779	Japanese quail (*Coturnix japonica*)	5	U	FD	5	w	1	d	JV	NR	CHM	HMGL	BL	13.5	67.4	69
8	Stone et al., 1981	6463	Japanese quail (*Coturnix japonica*)	5	U	FD	14	d	1	d	JV	B	CHM	HMGL	BL	34.5		69
9	Edens et al., 1976	2606	Japanese quail (*Coturnix japonica*)	5	U	FD	12	w	0	d	JV	F	CHM	CALC	BL		0.111	67
10	Franson et al., 1983	2636	American kestrel (*Falco sparverius*)	3	M	FD	6	mo	1-6	yr	AD	B	ENZ	ALAD	BL		2.52	71
11	Kendall and Scanlon, 1982	14770	Ringed Turtle Dove (*Streptopelia risoria*)	4	U	GV	7	d	NR	NR	AD	M	ENZ	ALAD	BL		25.0	68
12	Hoffman et al, 1985	11651	American kestrel (*Falco sparverius*)	4	U	GV	10	d	1	d	JV	NR	CHM	HMGL	BL		26.3	77
13	Edens and Melvin, 1989	2609	Japanese quail (*Coturnix japonica*)	2	U	FD	7	w	14	w	JV	F	CHM	CALC	PL		93.1	66
Behavior																		
14	Finley et al., 1976	2624	Mallard (*Anas platyrhynchos*)	4	M	FD	12	w	1	yr	AD	M	FDB	FCNS	WO	2.47		66
15	Edens and Garlich, 1983	2608	Chicken (*Gallus domesticus*)	5	U	FD	10	w	NR	NR	AD	F	FDB	FCNS	WO	3.26	6.52	75
16	Damron et al, 1969	14768	Chicken (*Gallus domesticus*)	4	U	FD	4	w	4	w	JV	NR	FDB	FEFF	WO	7.10	71.0	72
17	Pattec 1984	2809	American kestrel (*Falco sparverius*)	3	M	FD	6	mo	1 - 6	yr	AD	B	FDB	FCNS	WO	12.0		75
18	Damron et al, 1969	14768	Chicken (*Gallus domesticus*)	4	U	FD	4	w	4	w	JV	NR	FDB	FEFF	WO	61.4	123	74
19	Donaldson and McGowan, 1989	1285	Chicken (*Gallus domesticus*)	5	U	FD	20	d	1	d	JV	M	FDB	FEFF	WO	163		68
20	Bafundo et al. 1984	2517	Chicken (*Gallus domesticus*)	4	U	FD	14	d	8	d	JV	M	BEH	FEFF	WO	304	456	73
21	Edens and Garlich, 1983	2608	Japanese quail (*Coturnix japonica*)	4	U	FD	5	w	1	d	JV	F	FDB	FCNS	WO	1.94	19.4	71
22	Barthalmus et al., 1977	2526	Pigeon (*Columba livia*)	4	U	GV	17	d	NR	NR	AD	M	BEH	NMVM	WO		6.25	71
23	Stone and Soares, 1976	2898	Japanese quail (*Coturnix japonica*)	3	U	FD	32	d	NR	NR	AD	F	FDB	FCNS	WO		64.3	68
24	Edens and Melvin, 1989	2609	Japanese quail (*Coturnix japonica*)	2	U	FD	7	w	14	w	JV	F	FDB	FCNS	WO		93.1	69
25	Bafundo et al. 1984	2517	Chicken (*Gallus domesticus*)	4	U	FD	14	d	8	d	JV	M	BEH	FEFF	WO		456	67
Physiology																		
26	Edens and Garlich, 1983	2608	Chicken (*Gallus domesticus*)	5	U	FD	10	w	NR	NR	AD	F	PHY	SKIR	FE	6.24	12.5	75
Pathology																		
27	Finley et al., 1976	2624	Mallard (*Anas platyrhynchos*)	4	M	FD	12	w	1	yr	AD	M	GRS	BDWT	WO	2.33		66
28	Stone and Fox, 1984	6291	Japanese quail (*Coturnix japonica*)	3	U	FD	14	d	1	d	JV	B	ORW	ORWT	LI	2.77		68
29	Stone et al., 1977	2897	Japanese quail (*Coturnix japonica*)	2	U	FD	2	w	1	d	JV	NR	ORW	SMIX	KI	4.64		66
30	Edens and Garlich, 1983	2608	Chicken (*Gallus domesticus*)	5	U	FD	10	w	NR	NR	AD	F	GRS	BDWT	WO	6.24	12.5	75
31	Edens et al., 1976	2606	Japanese quail (*Coturnix japonica*)	5	U	FD	12	w	0	d	JV	M	ORW	ORWT	LI	11.89	119	75
32	Pattec 1984	2809	American kestrel (*Falco sparverius*)	3	M	FD	6	mo	1 - 6	yr	AD	B	GRS	BDWT	WO	12.0		84
33	Franson et al., 1983	2636	American kestrel (*Falco sparverius*)	3	M	FD	6	mo	1-6	yr	AD	B	ORW	SMIX	MT	14.1		70
34	Barthalmus et al., 1977	2526	Pigeon (*Columba livia*)	4	U	GV	55	d	NR	NR	AD	M	GRS	BDWT	WO	12.5	25.0	77
35	Cory-Slechta et al., 1980	2576	Pigeon (*Columba livia*)	4	U	GV	35	d	NR	NR	NR	M	ITX	GITX	WO	18.0	53.0	77
36	Hoffman et al., 1985	2696	American kestrel (*Falco sparverius*)	4	U	GV	10	d	1	d	JV	NR	ORW	ORWT	BR	25.0	125	84
37	Morgan et al., 1975	2779	Japanese quail (*Coturnix japonica*)	5	U	FD	5	w	1	d	JV	M	ORW	SMIX	AR	67.4	135	74
38	Kendall and Scanlon, 1982	14770	Ringed Turtle Dove (*Streptopelia risoria*)	4	U	GV	7	d	NR	NR	AD	M	GRS	BDWT	WO	75.0		69
39	Edens and Melvin, 1989	2609	Japanese quail (*Coturnix japonica*)	2	U	FD	7	w	14	w	JV	F	ORW	SMIX	FM	93.1		67
40	Edens, 1985	2605	Japanese quail (*Coturnix japonica*)	5	U	FD	12	w	1	w	JV	F	ORW	SMIX	BR	118		68
41	Vengris and Mare, 1974	14384	Chicken (*Gallus domesticus*)	7	U	GV	35	d	6	w	JV	B	ITX	ANR	WO	160	320	81
42	Rao et al., 1989	818	Duck (*Anas platyrhynchos*)	2	U	FD	12	w	7	mo	JV	F	HIS	GLBM	KI		1.71	67
43	Rao et al. 1989	817	Duck (*Anas platyrhynchos*)	2	U	FD	13	w	7	mo	JV	F	HIS	GHIS	KI		2.46	67
44	Anders et al., 1982	2513	Pigeon (*Columba livia*)	2	U	GV	5	w	NR	NR	AD	M	HIS	GHIS	KI		6.25	68
45	Donaldson and McGowan, 1989	1285	Chicken (*Gallus domesticus*)	5	U	FD	20	d	1	d	JV	M	ORW	ORWT	LI		38.2	67
46	Stone and Soares, 1976	2898	Japanese quail (*Coturnix japonica*)	3	U	FD	32	d	NR	NR	AD	F	ORW	SMIX	LI		64.3	68
47	Cupo and Donaldson, 1987	2579	Chicken (*Gallus domesticus*)	2	U	FD	21	d	1	d	JV	M	ORW	ORWT	AR		194	68
48	Johnsen and Damron 1982	2724	Goose (*Anser cygnides*)	5	U	FD	12	w	26	w	JV	NR	HIS	GHIS	LI		196	68
49	Stone and Soares, 1976	2898	Japanese quail (*Coturnix japonica*)	2	U	FD	27	d	NR	NR	AD	F	ORW	SMIX	TB		377	68
Reproduction																		
50	Edens and Garlich, 1983	2608	Japanese quail (*Coturnix japonica*)	4	U	FD	5	w	6	w	LB	F	REP	PROG	WO	0.194	1.94	77
51	Edens and Garlich, 1983	2608	Chicken (*Gallus domesticus*)	3	U	FD	4	w	NR	NR	LB	F	REP	PROG	WO	1.63	3.26	79
52	Meluzzi et al., 1996	2771	Chicken (*Gallus domesticus*)	4	U	FD	30	d	22	w	LB	F	EGG	ALWT	EG	2.69	4.04	81
53	Haegele et al. 1974	2668	Mallard (*Anas platyrhynchos*)	2	U	FD	76	d	NR	NR	SM	F	EGG	ESTH	EG	5.63		71
54	Pattec 1984	2809	American kestrel (*Falco sparverius*)	3	M	FD	6	mo	1-6	yr	AD	F	REP	RSUC	WO	12.0		90
55	Morgan et al., 1975	2779	Japanese quail (*Coturnix japonica*)	5	U	FD	5	w	6	d	JV	M	REP	TEWT	TE	12.6	126	78
56	Morgan et al., 1975	2779	Japanese quail (*Coturnix japonica*)	5	U	FD	5	w	1	d	JV	M	REP	TEWT	TE	67.4	135	80
57	Stone and Soares, 1976	2898	Japanese quail (*Coturnix japonica*)	3	U	FD	32	d	NR	NR	AD	F	REP	PROG	WO	125		67
58	Edens et al., 1976	2606	Japanese quail (*Coturnix japonica*)	5	U	FD	12	w	0	d	LB	B	REP	EGPN	EG		0.110	77

Table 5.1 Avian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
Lead

Result #	Reference	Ref No.	Test Organism	# of Conc/ Doses	Method of Analyses	Route of Exposure	Exposure Duration	Duration Units	Age	Age Units	Lifestage	Sex	Effect Type	Effect Measure	Response Site	NOAEL Dose (mg/kg bw/day)	LOAEL Dose (mg/kg bw/day)	Data Evaluation Score
59	Edens and Garlich, 1983	2608	Japanese quail (*Coturnix japonica*)	4	U	FD	12	w	NR	NR	LB	F	REP	PROG	WO		0.194	75
60	Edens and Garlich, 1983	2608	Chicken (*Gallus domesticus*)	5	U	FD	10	w	NR	NR	LB	F	REP	PROG	WO		3.26	75
61	Kendall and Scanlon, 1981	2734	Ringed Turtle Dove (*Streptopelia risoria*)	2	U	DR	11	w	NR	NR	AD	M	REP	TEWT	TE		11.8	68
62	Edens and Melvin, 1989	2609	Japanese quail (*Coturnix japonica*)	2	U	FD	1	w	14	w	JV	F	REP	TPRD	WO		93.1	75
63	Stone and Soares, 1976	2898	Japanese quail (*Coturnix japonica*)	2	U	FD	27	d	NR	NR	AD	F	REP	PROG	WO		377	74
Growth																		
64	Edens and Garlich, 1983	2608	Japanese quail (*Coturnix japonica*)	3	U	FD	5	w	1	d	JV	F	GRO	BDWT	WO	1.56	15.6	77
65	Stone and Fox, 1984	6291	Japanese quail (*Coturnix japonica*)	3	U	FD	2	w	1	d	JV	B	GRO	BDWT	WO	2.77		72
66	Stone et al., 1977	2897	Japanese quail (*Coturnix japonica*)	2	U	FD	2	w	1	d	JV	NR	GRO	BDWT	WO	4.64		70
67	Edens and Melvin, 1989	2609	Japanese quail (*Coturnix japonica*)	3	U	FD	4	w	0	d	JV	F	GRO	BDWT	WO	5.93	59.3	76
68	Damron et al, 1969	14768	Chicken (*Gallus domesticus*)	4	U	FD	4	w	4	w	JV	NR	GRO	BDWT	WO	6.14	61.4	76
69	Damron et al, 1969	14768	Chicken (*Gallus domesticus*)	4	U	FD	4	w	4	w	JV	NR	GRO	BDWT	WO	7.10	71.0	76
70	Edens et al., 1976	2606	Japanese quail (*Coturnix japonica*)	5	U	FD	12	w	0	d	JV	F	GRO	BDWT	WO	11.1	111	79
71	Edens, 1985	2605	Japanese quail (*Coturnix japonica*)	5	U	FD	12	w	1	w	JV	F	GRO	BDWT	WO	11.2	112	76
72	Morgan et al., 1975	2779	Japanese quail (*Coturnix japonica*)	5	U	FD	2	w	6	d	JV	NR	GRO	BDWT	WO	12.6	126	76
73	Morgan et al., 1975	2779	Japanese quail (*Coturnix japonica*)	5	U	FD	1	w	1	d	JV	NR	GRO	BDWT	WO	13.5	67.4	76
74	Howell and Hill, 1978	1387	Chicken (*Gallus domesticus*)	2	U	FD	21	d	1	d	JV	B	GRO	BDWT	WO	14.2		67
75	Jeng et. al, 1979	2718	Duck (*Anas platyrhynchos*)	3	U	GV	3	mo	24	w	MA	F	GRO	BDWT	WO	20.0		87
76	Hoffman et al., 1985	2696	American kestrel *(Falco sparverius*)	4	U	GV	10	d	1	d	JV	NR	GRO	BDWT	WO	25.0	125	88
77	Howell and Hill, 1978	1387	Chicken (*Gallus domesticus*)	2	U	FD	20	d	1	d	JV	B	GRO	BDWT	WO	28.4		67
78	Stone et al., 1981	6463	Japanese quail (*Coturnix japonica*)	5	U	FD	14	d	1	d	JV	B	GRO	BDWT	WO	34.5		77
79	Custer et al., 1984	2581	American kestrel (*Falco sparverius*)	4	M	FD	60	d	1-2	yr	AD	B	GRO	BDWT	WO	54.3		68
80	Berg et al., 1980	2534	Chicken (*Gallus domesticus*)	5	U	FD	2	w	1	d	JV	M	GRO	BDWT	WO	61.3	123	83
81	Frederick, 1976	2638	Mallard (*Anas platyrhynchos*)	4	U	FD	8	d	9	d	JV	NR	GRO	BDWT	WO	66.9		67
82	Donaldson and McGowan, 1989	1285	Chicken (*Gallus domesticus*)	5	U	FD	20	d	1	d	JV	M	GRO	BDWT	WO		38.2	72
83	Latta and Donaldson, 1986	2744	Chicken (*Gallus domesticus*)	2	U	FD	3	w	1	d	JV	M	GRO	BDWT	WO		53.1	71
84	Stone and Soares, 1976	2898	Japanese quail (*Coturnix japonica*)	3	U	FD	32	d	NR	NR	AD	F	GRO	BDWT	WO		64.3	72
85	Leeming and Donaldson, 1984	2748	Chicken (*Gallus domesticus*)	2	U	FD	19	d	1	d	JV	M	GRO	BDWT	WO		76.3	71
86	Berg et al., 1980	2534	Chicken (*Gallus domesticus*)	3	U	FD	2	w	1	d	JV	M	GRO	BDWT	WO		124	77
87	Bafundo et al. 1984	2517	Chicken (*Gallus domesticus*)	4	U	FD	14	d	8	d	JV	M	GRO	BDWT	WO		152	71
88	Donaldson, 1986	2600	Chicken (*Gallus domesticus*)	2	U	FD	20	d	1	d	JV	M	GRO	BDWT	WO		163	72
89	Khan, et al, 1993	5507	Chicken (*Gallus domesticus*)	2	U	OR	4	w	NR	NR	JV	B	GRO	BDWT	WO		200	74
90	Cupo and Donaldson, 1987	2579	Chicken (*Gallus domesticus*)	2	U	FD	7	d	1	d	JV	M	GRO	BDWT	WO		262	72
91	Berg et al., 1980	2534	Chicken (*Gallus domesticus*)	2	U	FD	2	w	1	d	JV	M	GRO	BDWT	WO		270	77
92	Franson and Custer, 1982	2635	Chicken (*Gallus domesticus*)	2	U	FD	7	d	1	d	IM	NR	GRO	BDWT	WO		273	72
93	Bafundo et al. 1984	2517	Chicken (*Gallus domesticus*)	2	U	FD	14	d	8	d	JV	M	GRO	BDWT	WO		282	71
Survival																		
94	Finley et al., 1976	2624	Mallard (*Anas platyrhynchos*)	4	M	FD	12	w	1	yr	AD	M	MOR	MORT	WO	2.47		80
95	Barthalmus et al., 1977	2526	Pigeon (*Columba livia*)	4	U	GV	40	d	NR	NR	AD	M	MOR	MORT	WO	12.5	25.0	82
96	Howell and Hill, 1978	1387	Chicken (*Gallus domesticus*)	2	U	FD	21	d	1	d	JV	B	MOR	MORT	WO	14.2		77
97	Howell and Hill, 1978	1387	Chicken (*Gallus domesticus*)	2	U	FD	20	d	1	d	JV	B	MOR	MORT	WO	28.4		77
98	Custer et al., 1984	2581	American kestrel (*Falco sparverius*)	4	M	FD	60	d	1-2	yr	AD	B	MOR	MORT	WO	54.3		78
99	Frederick, 1976	2638	Mallard (*Anas platyrhynchos*)	4	U	FD	8	d	9	d	JV	NR	MOR	MORT	WO	66.9		77
100	Hoffman et al., 1985	2696	American kestrel (*Falco sparverius*)	4	U	GV	10	d	1	d	JV	NR	MOR	SURV	WO	125	625	89
101	Vengris and Mare, 1974	14384	Chicken (*Gallus domesticus*)	7	U	GV	35	d	6	w	JV	B	MOR	MORT	WO	160	320	86
102	Donaldson and McGowan, 1989	1285	Chicken (*Gallus domesticus*)	5	U	FD	20	d	1	d	JV	M	MOR	MORT	WO	163		66
103	Johnsen and Damron 1982	2724	Goose (*Anser cygnides*)	5	U	FD	12	w	26	w	JV	NR	MOR	MORT	WO	196		73
104	Anders et al., 1982	2513	Pigeon (*Columba livia*)	2	U	GV	4	w	NR	NR	AD	M	MOR	MORT	WO		6.25	73
105	Cupo and Donaldson, 1987	2579	Chicken (*Gallus domesticus*)	2	U	FD	21	d	1	d	JV	M	MOR	MORT	WO		194	73
106	Khan et al, 1993	1415	Chicken (*Gallus domesticus*)	2	U	GV	7	d	43	d	JV	F	MOR	MORT	WO		400	80

AD = adult; ALAD = (delta) -aminolevulinic acid dehydrogenase; ALWT = albumin weight; ANR = anorexia; AR = adrenal; B = both; BEH = behavior; BDWT = body weight changes; BEH = behavior; BL = blood; BR = brain; CALC = calcium; CHM = chemical changes; d = days; DR = Drinking water; EG = egg; EGG = effects on eggs; EGPN = egg production; ENZ = enzyme changes; ESTH = eggshell thinning; F = female; FCNS = food consumption; FD = food; FDB = feeding behavior; FE = feathers; FEFF = feed effeciency; FM = femur; GE = gestation; GHIS = general histology; GITX = general intoxication; GLBM = glomerular basement membrane; GRO = growth; GRS = gross body weight changes (not growth); GV = gavage; HIS = histology; HMCT = hematocrit; HMGL = hemoglobin; IM = immature; INTX = intoxication; ITX = intoxication; JV = juvenile; KI = kidney; LB = laying bird; LI = liver; MA = mature; M = male; M = measured; mo = months; MOR = effects on survival; MORT = mortality; NMVM = number of movements; NR = Not reported; OR = other oral; ORW = organ weight changes; ORWT = organ weight; PHY = physiology; PL = plasma; PROG = progeny counts or numbers; REP = reproduction; RSUC = reproductive success; SKIR = skin irritation; SM = sexually mature; SMIX = weight relative to body weight; SURV = survival; TB = tibia; TE = testes; TEDG = testes degeneration; TEWT = testes weight; TPRD = total production; U = unmeasured; w = weeks; WO = whole organism; yr = years.

Within the reviewed papers, there are 106 results for biochemical (BIO), behavioral (BEH), physiology (PHY), pathology (PTH), reproduction (REP), growth (GRO), and survival (MOR) effects that meet the Data Evaluation Score of > 65 for use to derive the TRV (U.S. EPA, 2003; Attachment 4-4). These data are plotted in Figure 5.1 and correspond directly with the data presented in Table 5.1. The no-observed adverse effect level (NOAEL) results for growth and reproduction are used to calculate a geometric mean NOAEL. This mean NOAEL is examined in relationship to the lowest bounded lowest-observed adverse effect level (LOAEL) for reproduction, growth, and survival to derive the TRV according to procedures in the Eco-SSL guidance (U.S. EPA, 2003; Attachment 4-5).

A geometric mean of the NOAEL values for reproduction and growth was calculated at 10.9 mg lead/kg bw/day. However, this value is higher than the lowest bounded LOAEL for reproduction, growth, or survival (Figure 5.1). Therefore, the TRV is equal to the highest bounded NOAEL, lower than the lowest bounded LOAEL for reproduction, growth, or survival, and is equal to 1.63 mg lead/kg bw/day.

5.2 Estimation of Dose and Calculation of the Eco-SSL

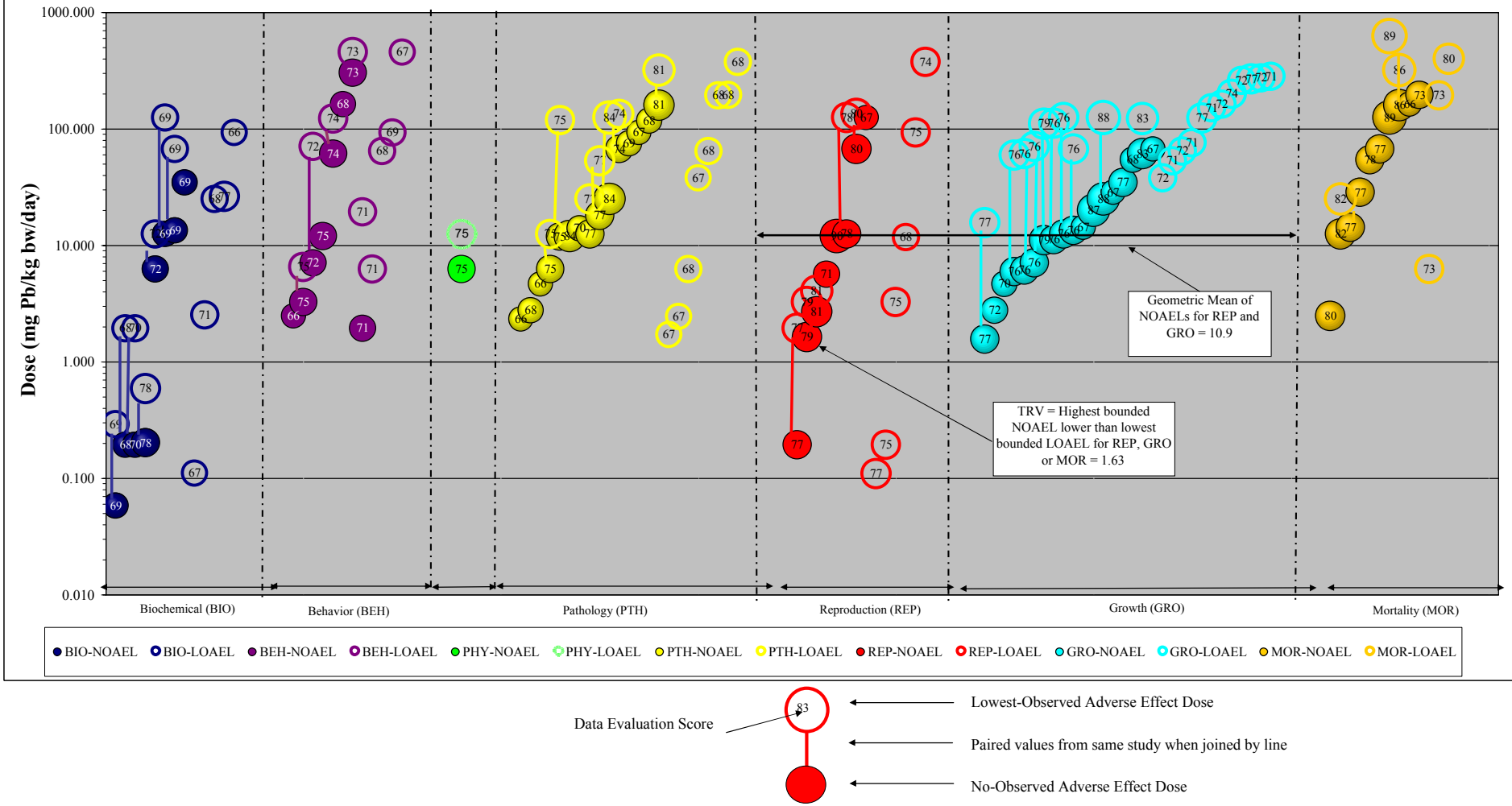
Three separate Eco-SSL values were calculated for avian wildlife, one each for three receptor groups representing different trophic levels. The avian Eco-SSLs were calculated according to the Eco-SSL guidance (U.S. EPA, 2003) and are summarized in Table 5.2.

Table 5.2 Calculation of the Avian Eco-SSLs for Lead

Surrogate Receptor Group	TRV for Lead (mg dw/kg bw/d) [1]	Food Ingestion Rate (FIR)[2] (kg dw/kg bw/d)	Soil Ingestion as Proportion of Diet (P_s)[2]	Concentration of Lead in Biota Type (i)[2,3] (B_i) (mg/kg dw)	Eco-SSL (mg/kg dw)[4]
Avian herbivore (dove)	1.63	0.190	0.139	$\ln(B_i) = 0.561 * \ln(Soil_j) - 1.328$ where i = plants	46
Avian ground insectivore (woodcock)	1.63	0.214	0.164	$\ln(B_i) = 0.807 * \ln(Soil_j) - 0.218$ where i = earthworms	11
Avian carnivore (hawk)	1.63	0.0353	0.057	$\ln(B_i) = 0.4422 * \ln(Soil_j) + 0.0761$ where i = mammals	510

[1] The process for derivation of wildlife TRVs is described in Attachment 4-5 of U.S. EPA (2003).
[2] Parameters (FIR, P_s, B_i values, regressions) are provided in U.S. EPA (2003) Attachment 4-1 (revised February 2005).
[3] B_i = Concentration in biota type (i) which represents 100% of the diet for the respective receptor.
[4] $HQ = FIR * (Soil_j * P_s + B_i) / TRV$ solved for HQ=1 where $Soil_j$ = Eco-SSL (Equation 4-2; U.S. EPA, 2003).
NA = Not Applicable

Figure 5.1 Avian TRV Derivation for Lead



Wildlife TRV Derivation Process

1) There are at least three results available for two test species within the growth, reproduction, and mortality effect groups. There are enough data to derive a TRV.

2) There are three NOAEL results available for calculation of a geometric mean.

4) The geometric mean is equal to 10.9 mg/kg bw/d but is higher than the lowest bounded LOAEL within the reproduction, growth, and survival R effect groups.

5) The avian wildlife TRV for lead is equal to 1.63 mg lead/kg bw/day which is the highest bounded NOAEL below the lowest bounded LOAEL for effects on growth, reproduction, and survival.

6.0 ECO-SSL FOR MAMMALIAN WILDLIFE

The derivation of the Eco-SSL for mammalian wildlife was completed as two parts. First, the TRV was derived according to the Eco-SSL guidance (U.S. EPA, 2003; Attachment 4-5). Second, the Eco-SSL (soil concentration) was back-calculated for each of three surrogate species based on the wildlife exposure model and the TRV (U.S. EPA, 2003).

6.1 Mammalian TRV

The literature search was completed according to the Eco-SSL guidance (U.S. EPA, 2003; Attachment 4-2) and identified 2,429 papers with possible toxicity data for lead for either avian or mammalian species. Of these studies, 2,157 were rejected for use as described in Section 7.5. Of the remaining papers, 219 contained data for mammalian test species. These papers were reviewed and the data were extracted and scored according to the Eco-SSL guidance (U.S. EPA, 2003; Attachment 4-3). The results of the data extraction and review are summarized in Table 6.1. The complete results are provided in Appendix 6-1.

Within the 219 papers there were 343 results for biochemical (BIO), behavioral (BEH), physiology (PHY), pathology (PTH), reproduction (REP), growth (GRO), and survival (MOR) endpoints with a total Data Evaluation Score >65 that were used to derive the TRV (U.S. EPA, 2003; Attachment 4-4). These data are plotted in Figure 6.1 and correspond directly with the data presented in Table 6.1. The NOAEL results for growth and reproduction are used to calculate a geometric mean NOAEL. This mean NOAEL is examined in relationship to the lowest bounded LOAEL for reproduction, growth, and survival to derive the TRV according to procedures in the Eco-SSL guidance (U.S. EPA, 2003; Attachment 4-5).

A geometric mean of the NOAEL values for reproduction and growth was calculated at 40.7 mg lead/kg bw/day. However, this value is higher than the lowest bounded LOAEL for reproduction, growth or mortality results. Therefore, the TRV is equal to the highest bounded NOAEL below the lowest bounded LOAEL for reproduction, growth, or survival and is equal to 4.70 mg lead/kg bw/day.

6.2 Estimation of Dose and Calculation of the Eco-SSL

Three separate Eco-SSL values are calculated for mammalian wildlife, one each for three receptor groups representing different trophic levels. The mammalian Eco-SSLs derived for lead are calculated according to the Eco-SSL guidance (U.S. EPA 2003) and are summarized in Table 6.2.

Table 6.1 Mammalian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
Lead

Result #	Reference	Ref No.	Test Organism	# of Conc/ Doses	Method of Analyses	Route of Exposure	Exposure Duration	Duration Units	Age	Age Units	Lifestage	Sex	Effect Type	Effect Measure	Response Site	NOAEL Dose (mg/kg bw/day)	LOAEL Dose (mg/kg bw/day)	Data Evaluation Score
Biochemical																		
1	Kimmel et al., 1980	2737	Rat (*Rattus norvegicus*)	4	U	DR	10	w	21	d	JV	F	ENZ	ALAD	UR	0.920	4.70	71
2	Horwitt and Cowgill, 1937	3873	Dog (*Canis familiaris*)	3	M	FD	7	mo	NR	NR	JV	NR	CHM	HMGL	BL	1.18	4.45	74
3	Azar et al., 1973	3747	Rat (*Rattus norvegicus*)	5	M	FD	2	yr	NR	NR	NR	B	ENZ	ALAD	BL	1.39	4.80	73
4	Carson et al., 1973	3830	Sheep (*Ovis aries*)	3	U	FD	27	w	NR	NR	GE	F	CHM	PCLV	BL	2.30	4.50	74
5	Azar et al., 1973	3747	Dog (*Canis familiaris*)	5	M	FD	2	yr	NR	NR	NR	B	ENZ	ALAD	BL	2.45	6.66	75
6	Jessup and Shott, 1969	11831	Rat (*Rattus norvegicus*)	5	U	FD	12	mo	70	d	LC	B	ENZ	G6PD	BL	4.29	8.58	71
7	Hammond et al., 1989	2675	Rat (*Rattus norvegicus*)	4	U	DR	23	d	22	d	JV	F	CHM	SOMC	BL	5.8	29.0	66
8	Mahaffey et al., 1973	2756	Rat (*Rattus norvegicus*)	7	U	DR	10	w	NR	NR	JV	M	CHM	HMCT	BL	5.9	12.9	70
9	Gupta et al., 1995	2666	Mouse (*Mus musculus*)	4	U	GV	52	d	2	mo	GE	F	ENZ	ALAD	KI	13.7	27.3	71
10	Logner et al., 1984	3889	Cattle (*Bos taurus*)	4	U	FD	6	w	74	d	JV	M	CHM	PCLV	BL	16.0	43.0	80
11	Barratt et al., 1989	2524	Rat (*Rattus norvegicus*)	4	U	GV	9	w	10	w	JV	M	CHM	PRTL	LI	18.0	180	76
12	Fick et al., 1976	3704	Sheep (*Ovis aries*)	5	U	FD	84	d	NR	NR	JV	M	CHM	HMGL	BL	32.7		66
13	Agodi et al., 1990	2507	Rat (*Rattus norvegicus*)	2	U	GV	28	d	2	d	JV	B	ENZ	SCDH	BR	50.0		70
14	Kempinas et. al 1988	2733	Rat (*Rattus norvegicus*)	3	U	DR	90	d	NR	NR	AD	M	CHM	HMCT	BL	61.2	122	66
15	Vyskocil et al., 1995	2923	Rat (*Rattus norvegicus*)	3	U	DR	1	mo	9-10	w	SM	F	CHM	GBCM	UR	81.3	320	68
16	Petrusz et al., 1979	2815	Rat (*Rattus norvegicus*)	4	U	GV	18	d	2	d	JV	F	HRM	Other	PI	100	200	78
17	Harry et al., 1985	2680	Rat (*Rattus norvegicus*)	2	U	GV	29	d	2	d	JV	B	CHM	PRTL	BR	200		72
18	Vyskocil et al., 1989	2922	Rat (*Rattus norvegicus*)	4	U	DR	1	mo	8	w	JV	M	CHM	B2MG	UR	320	640	66
19	Holtzman et al., 1982	2697	Rat (*Rattus norvegicus*)	4	U	GV	14	d	18	d	JV	NR	CHM	PCLV	BL	400	800	78
20	Holtzman et al., 1982	2697	Rat (*Rattus norvegicus*)	5	U	GV	14	d	14	d	JV	NR	CHM	PCLV	BL	800	1600	78
21	Holtzman et al., 1982	2697	Rat (*Rattus norvegicus*)	3	U	GV	14	d	20	d	JV	NR	CHM	PCLV	BL	2400	3200	78
22	Lynch et al, 1975	14380	Cattle (*Bos taurus*)	4	U	OR	7	w	1	w	JV	M	ENZ	ALAD	BL		0.496	77
23	Singh and Ashraf, 1989	2877	Rat (*Rattus norvegicus*)	2	U	GV	10	w	5	d	JV	B	HRM	NORE	BR		1.00	72
24	Nehru and Kaushal, 1991	2789	Rat (*Rattus norvegicus*)	4	U	GV	15	d	NR	NR	NR	F	ENZ	SCDH	KI		1.37	72
25	Lassen and Buck, 1979	3709	Pig (*Sus scrofa*)	5	U	DR	1	w	6	w	JV	NR	ENZ	ALAD	BL		3.77	69
26	Lynch et al., 1976	3711	Cattle (*Bos taurus*)	3	U	OR	42	d	NR	NR	JV	M	ENZ	ALAD	BL		4.16	77
27	Lorenzo et al., 1978	2751	Rabbit (*Oryctolagus cuniculus*)	5	U	GV	30	d	1	d	JV	F	CHM	Other	BL		7.20	72
28	Kelliher, et al. 1973	14377	Cattle (*Bos taurus*)	2	U	FD	133	d	7	mo	JV	M	ENZ	ALAD	BL		15.0	69
29	Cerklewski and Forbes, 1977	2625	Rat (*Rattus norvegicus*)	2	U	FD	1	w	21	d	GE	M	ENZ	ALAD	UR		15.3	66
30	Mahaffey et al., 1977	14580	Rat (*Rattus norvegicus*)	2	UX	FD	10	w	NR	NR	JV	M	CHM	RBCE	BL		15.4	72
31	Rader et al., 1981	2830	Rat (*Rattus norvegicus*)	2	U	OR	6	w	NR	NR	JV	M	ENZ	ALAD	UR		15.5	67
32	Gelman and Michaelson, 1979	14821	Rat (*Rattus norvegicus*)	4	U	GV	19	d	2	d	JV	B	CHM	HMCT	BL		25.0	72
33	Singh et al, 1994	21095	Rat (*Rattus norvegicus*)	3	U	GV	1	mo	NR	NR	JV	F	CHM	POTA	BL		50.0	72
34	Batra et al., 1998	2528	Rat (*Rattus norvegicus*)	2	U	GV	3	mo	8	w	SM	M	ENZ	ALAD	TE		50.0	72
35	White, 1977	2929	Dog (*Canis familiaris*)	3	U	OR	1	w	<1	yr	JV	NR	ENZ	DHYD	KI		50.0	77
36	Azar et al., 1973	3747	Rat (*Rattus norvegicus*)	3	M	FD	2	yr	NR	NR	NR	B	ENZ	ALAD	BL		87.5	69
37	Rudra Pal et al., 1975	2806	Rat (*Rattus norvegicus*)	2	U	FD	4	w	NR	NR	NR	M	CHM	HMGL	BL		100	69
38	Shailesh Kumar and Desiraju, 1990	2870	Rat (*Rattus norvegicus*)	3	U	GV	58	d	2	d	JV	B	HRM	DOPA	BR		100	72
39	Hsu et al, 1975	14376	Pig (*Sus scrofa*)	2	U	FD	2	w	4	w	JV	NR	CHM	CALC	SR		173	66
40	Yagminas et al., 1990	3937	Rat (*Rattus norvegicus*)	2	U	GV	91	d	NR	NR	JV	M	CHM	BUNT	BL		200	72
41	Toews et al., 1983	2911	Rat (*Rattus norvegicus*)	2	U	GV	28	d	2	d	JV	M	CHM	PRTL	BR		400	72
42	Holtzman et al., 1982	2697	Rat (*Rattus norvegicus*)	4	U	GV	14	d	24	d	JV	NR	CHM	PCLV	BL		400	72
43	Holtzman et al., 1982	2697	Rat (*Rattus norvegicus*)	4	U	GV	14	d	16	d	JV	NR	CHM	PCLV	BL		1600	72
Behavior																		
44	Dilts and Ahokas, 1979	2593	Rat (*Rattus norvegicus*)	6	U	DR	21	d	NR	NR	GE	F	FDB	FCNS	WO	1.00	5.0	68
45	Sawicka-Kapusta et al., 1987	820	Bank vole (*Clethrionomys glareolus*	3	M	FD	20	d	NR	NR	AD	B	FDB	FCNS	WO	1.10	34.6	80
46	Morris et al, 1938	15125	Rat (*Rattus norvegicus*)	3	U	FD	339	d	26-27	d	JV	B	FDB	FCNS	WO	2.50	18.3	74
47	Hammond et al., 1989	2675	Rat (*Rattus norvegicus*)	4	U	DR	23	d	22	d	JV	F	FDB	WCON	WO	5.80	29.0	69
48	Lynch et al., 1976	3711	Cattle (*Bos taurus*)	3	U	OR	84	d	NR	NR	JV	M	FDB	FCNS	WO	7.79		73
49	Mahaffey et al., 1977	14580	Rat (*Rattus norvegicus*)	2	UX	FD	10	w	NR	NR	JV	M	FDB	FCNS	WO	15.4		75
50	Mahaffey et al., 1973	2756	Rat (*Rattus norvegicus*)	7	U	DR	10	w	NR	NR	JV	M	FDB	FCNS	WO	24.3		67
51	Logner et al., 1984	3889	Cattle (*Bos taurus*)	4	U	FD	7	w	74	d	JV	M	FDB	FCNS	WO	43.0		70
52	Sourgens et al., 1987	2889	Rat (*Rattus norvegicus*)	4	U	DR	30	d	52	d	JV	B	FDB	WCON	WO	56.0	285	67
53	Vyskocil et al., 1995	2923	Rat (*Rattus norvegicus*)	3	U	DR	2	mo	9-10	w	SM	F	FDB	WCON	WO	81.3	320	71
54	Shailesh Kumar and Desiraju, 1990	2870	Rat (*Rattus norvegicus*)	3	U	GV	58	d	2	d	JV	B	FDB	FCNS	WO	100	400	79
55	Maker et al., 1973	2758	Mouse (*Mus musculus*)	7	U	FD	28	d	NR	NR	LC	F	AVO	FOOD	WO	101	202	73
56	Maker et al., 1973	2758	Mouse (*Mus musculus*)	7	U	FD	28	d	NR	NR	LC	F	AVO	FOOD	WO	101	202	73
57	Sokol et al., 1985	2888	Rat (*Rattus norvegicus*)	3	U	DR	30	d	52	d	JV	M	FDB	WCON	WO	169	508	70

Table 6.1 Mammalian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
Lead

Result #	Reference	Ref No.	Test Organism	# of Conc/ Doses	Method of Analyses	Route of Exposure	Exposure Duration	Duration Units	Age	Age Units	Lifestage	Sex	Effect Type	Effect Measure	Response Site	NOAEL Dose (mg/kg bw/day)	LOAEL Dose (mg/kg bw/day)	Data Evaluation Score
58	Yagminas et al., 1990	3937	Rat (*Rattus norvegicus*)	2	U	GV	91	d	NR	NR	JV	M	FDB	FCNS	WO	200		66
59	Lockett and Leary, 1986	633	Rat (*Rattus norvegicus*)	2	UX	DR	16	mo	NR	NR	JV	M	BEH	ACTV	WO		0.577	66
60	Wolfe et al, 1996	2502	Rat (*Rattus norvegicus*)	5	M	DR	1	w	94	d	JV	M	FDB	WCON	WO		23	72
61	Hammond et al., 1993	2677	Rat (*Rattus norvegicus*)	2	U	DR	26	d	22	d	JV	F	FDB	WCON	WO		29.5	66
62	Hammond et al., 1993	2677	Rat (*Rattus norvegicus*)	2	U	DR	14	d	26	d	JV	F	FDB	WCON	WO		29.9	66
63	Kishi et al., 1983	12025	Rat (*Rattus norvegicus*)	4	U	GV	18	d	3	d	JV	M	BEH	RRSP	WO		45.0	75
64	Nation et al., 1990	617	Rat (*Rattus norvegicus*)	2	U	FD	61	d	50	d	JV	M	BEH	ACTP	WO		45.7	68
65	Pankakoski et al., 1994	2807	Shrew (*Sorex araneus*)	4	M	FD	31	d	NR	NR	JV	B	FDB	FCNS	WO		61.5	72
66	Wolfe et al, 1996	2502	Rat (*Rattus norvegicus*)	2	M	DR	1	w	99	d	JV	M	FDB	WCON	WO		194	72
67	Hallen et al., 1995	2669	Rat (*Rattus norvegicus*)	2	U	DR	13	w	NR	NR	GE	F	FDB	WCON	WO		200	67
68	Piasekand Kostial, 1987	2817	Rat (*Rattus norvegicus*)	4	U	DR	18	w	NR	NR	JV	M	FDB	WCON	WO		216	67
69	Barrett and Livesey, 1983	10239	Rat (*Rattus norvegicus*)	4	U	FD	10	d	NR	NR	LC	F	BEH	ACTV	WO		323	74
70	Piasek and Kostial 1991	2818	Rat (*Rattus norvegicus*)	2	U	DR	20	w	10	w	GE	F	FDB	WCON	WO		750	67
71	Gulati et al, 1985	2837	Mouse (*Mus musculus*)	4	M	DR	1	w	11	w	JV	F	FDB	WCON	WO		775	69
72	Michaelson and Sauerhoff, 1974	2774	Rat (*Rattus norvegicus*)	2	U	FD	18	d	NR	NR	LC	F	FDB	FCNS	WO		6170	68
Physiology																		
73	Boscolo et al, 1992	21113	Rat (*Rattus norvegicus*)	4	U	DR	14	mo	NR	NR	JV	M	PHY	BLPR	WO	1.69	3.39	68
74	Sawicka-Kapusta et al., 1987	820	Bank vole (*Clethrionomys glareolus*	3	M	FD	20	d	NR	NR	AD	B	PHY	GPHY	WO	34.6		69
75	Logner et al., 1984	3889	Cattle (*Bos taurus*)	4	U	FD	7	w	74	d	JV	M	PHY	BTMP	WO	43.0		75
76	Rader et. al. 1981	2829	Rat (*Rattus norvegicus*)	2	U	DR	5	w	NR	NR	JV	M	PHY	EXCR	UR		16.1	67
77	Rudra Pal et al., 1975	2806	Rat (*Rattus norvegicus*)	2	U	FD	4	w	NR	NR	JV	M	PHY	EXCR	UR		100	72
Pathology																		
78	Horwitt and Cowgill, 1937	3873	Dog (*Canis familiaris*)	3	U	FD	2	mo	NR	NR	JV	NR	HIS	GHIS	BL	1.18	4.45	77
79	Nehru and Kaushal, 1991	2789	Rat (*Rattus norvegicus*)	4	U	GV	3	mo	NR	NR	NR	F	HIS	GHIS	KI	1.37	2.73	81
80	Morris et al, 1938	15125	Rat (*Rattus norvegicus*)	3	U	FD	339	d	26-27	d	JV	B	ORW	ORWT	KI	2.49	18.3	72
81	Jessup and Shott, 1969	11831	Rat (*Rattus norvegicus*)	5	U	FD	92	w	3	d	JV	B	ORW	SMIX	HE	3.75	7.49	74
82	Lorenzo et al., 1978	2751	Rabbit (*Oryctolagus cuniculus*)	3	U	GV	30	d	1	d	JV	F	HIS	NCRO	KI	6.08	28.4	79
83	Sierra and Tiffany-Castiglioni, 1992	2876	Guinea pig (*Cavia porcellus*)	3	U	DR	40	d	NR	NR	GE	F	ORW	ORWT	BR	11.0		67
84	Rader et al., 1981	2830	Rat (*Rattus norvegicus*)	2	U	DR	6	w	NR	NR	JV	M	ORW	ORWT	BR	15.1		67
85	Logner et al., 1984	3889	Cattle (*Bos taurus*)	4	U	FD	32	d	74	d	JV	M	ITX	PARL	WO	16.0	43.0	83
86	Rader et. al. 1981	2829	Rat (*Rattus norvegicus*)	2	U	DR	7	w	NR	NR	JV	M	ORW	ORWT	BR	16.1		72
87	Wolfe et al, 1996	2502	Rat (*Rattus norvegicus*)	5	M	DR	4	w	94	d	JV	F	ORW	ORWT	KI	21.3	43.0	78
88	Goyer et al., 1970	14799	Rat (*Rattus norvegicus*)	6	U	DR	10	w	NR	NR	LC	M	HIS	IIBD	KI	40.0	68.6	69
89	Agodi et al., 1990	2507	Rat (*Rattus norvegicus*)	2	U	GV	28	d	2	d	JV	B	ORW	ORWT	BR	50.0		75
90	Vyskocil et al., 1995	2923	Rat (*Rattus norvegicus*)	3	U	DR	1	mo	9-10	w	SM	F	ORW	SMIX	KI	81.3	320	71
91	Petrusz et al., 1979	2815	Rat (*Rattus norvegicus*)	4	U	GV	18	d	2	d	JV	B	ORW	ORWT	PI	200		66
92	Alfano and Petit, 1982	2511	Rat (Rattus norvegicus)	3	U	FD	25	d	NR	NR	LC	F	GRS	BDWT	WO	258	2580	76
93	Holtzman et al., 1982	2697	Rat (*Rattus norvegicus*)	4	U	GV	14	d	16	d	JV	NR	HIS	ENCP	BR	400	800	81
94	Holtzman et al., 1982	2697	Rat (*Rattus norvegicus*)	5	U	GV	14	d	18	d	JV	NR	HIS	ENCP	BR	400	800	81
95	Gerber et al, 1978	14822	Rat (*Rattus norvegicus*)	2	U	FD	14	mo	0	d	JV	NR	ORW	ORWT	BR	431		68
96	Holtzman et al., 1982	2697	Rat (*Rattus norvegicus*)	4	U	GV	14	d	18	d	JV	NR	HIS	ENCP	BR	2400		75
97	Holtzman et al., 1982	2697	Rat (*Rattus norvegicus*)	3	U	GV	14	d	14	d	JV	NR	HIS	ENCP	BR	3200		66
98	Schroeder and Mitchener, 1975	1858	Mouse (*Mus musculus*)	2	U	DR	520	d	19-20	d	JV	F	HIS	EDMA	WO		3.39	68
99	Nehru et al., 1997	2788	Rat (*Rattus norvegicus*)	2	U	GV	8	w	NR	NR	JV	F	ORW	ORWT	BR		10.0	67
100	Mahaffey et al., 1977	14580	Rat (*Rattus norvegicus*)	2	UX	FD	10	w	NR	NR	JV	M	ORW	SMIX	KI		15.4	75
101	Rader et al., 1981	2830	Rat (*Rattus norvegicus*)	2	U	OR	6	w	NR	NR	AD	M	ORW	ORWT	BR		15.5	70
102	Wells, et.al, 1986	14803	Cattle (*Bos taurus*)	2	U	DR	8	d	3	mo	JV	M	HIS	GLSN	BR		20.0	67
103	Karmakar et al., 1986	3879	Rat (*Rattus norvegicus*)	2	U	GV	30	d	NR	NR	AD	B	HIS	GHIS	MT		44.0	75
104	Al-Omar et al, 2000	20974	Mouse (*Mus musculus*)	2	M	GV	5	w	NR	NR	JV	M	HIS	USTR	SV		46.4	80
105	White, 1977	2929	Dog (*Canis familiaris*)	2	U	OR	5	w	<1	yr	JV	NR	HIS	GHIS	LI		50.0	80
106	Pankakoski et al., 1994	2807	Shrew (*Sorex araneus*)	4	M	FD	31	d	NR	NR	JV	B	HIS	GHIS	KI		61.5	72
107	Rudra Pal et al., 1975	2806	Rat (*Rattus norvegicus*)	2	U	FD	4	w	NR	NR	JV	M	ORW	SMIX	KI		100	72
108	Shailesh Kumar and Desiraju, 1990	2870	Rat (*Rattus norvegicus*)	3	U	GV	58	d	2	d	JV	B	ORW	ORWT	BR		100	75
109	Brown, 1974	2548	Rabbit (*Oryctolagus cuniculus*)	2	U	FD	5	mo	5	mo	JV	B	HIS	GHIS	EY		153	68
110	Wolfe et al, 1996	2502	Rat (*Rattus norvegicus*)	2	M	DR	4	w	99	d	JV	M	PTH	BDWT	WO		171	72
111	Harry et al., 1985	2680	Rat (*Rattus norvegicus*)	2	U	GV	29	d	2	d	JV	F	ORW	ORWT	BR		200	75
112	Yagminas et al., 1990	3937	Rat (*Rattus norvegicus*)	2	U	GV	91	d	NR	NR	JV	M	ORW	ORWT	KI		200	75
113	Press 1975	2827	Rat (*Rattus norvegicus*)	2	U	GV	7	d	1	d	JV	B	ITX	PARL	WO		328	75
114	Holtzman et al., 1982	2697	Rat (*Rattus norvegicus*)	4	U	GV	14	d	20	d	JV	NR	HIS	ENCP	BR		400	75
115	Toews et al., 1983	2911	Rat (*Rattus norvegicus*)	2	U	GV	28	d	2	d	JV	M	ORW	ORWT	BR		400	75
116	Brashear et al., 1978	2546	Rat (*Rattus norvegicus*)	2	U	GV	18	d	2	d	JV	B	ORW	ORWT	BR		1000	80
117	Gerber et al, 1978	14822	Rat (*Rattus norvegicus*)	2	U	FD	1	mo	0	d	JV	NR	ORW	ORWT	BR		1220	68

Table 6.1 Mammalian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
Lead

Result #	Reference	Ref No.	Test Organism	# of Conc/ Doses	Method of Analyses	Route of Exposure	Exposure Duration	Duration Units	Age	Age Units	Lifestage	Sex	Effect Type	Effect Measure	Response Site	NOAEL Dose (mg/kg bw/day)	LOAEL Dose (mg/kg bw/day)	Data Evaluation Score
118	Dyck et al., 1980	2604	Rat (*Rattus norvegicus*)	2	U	FD	12	w	NR	NR	AD	NR	HIS	GHIS	NE		2730	66
119	Myers et al., 1979	2782	Rat (*Rattus norvegicus*)	2	U	FD	7	w	NR	NR	AD	B	HIS	GHIS	NE		3620	72
120	Michaelson and Sauerhoff, 1974	2774	Rat (*Rattus norvegicus*)	2	U	FD	17	d	NR	NR	LC	F	GRS	BDWT	WO		6170	68
	Reproduction																	
121	Grant et al., 1980	2658	Rat (*Rattus norvegicus*)	5	U	DR	62	d	21	d	GE	F	REP	PRWT	WO	0.710	7.00	77
122	Dilts and Ahokas, 1979	2593	Rat (*Rattus norvegicus*)	6	U	DR	21	d	NR	NR	GE	F	REP	PRWT	WO	1.00	5.00	74
123	Gandley et al., 1999	2642	Rat (*Rattus norvegicus*)	3	U	DR	35	d	NR	NR	AD	M	REP	RSUC	WO	2.60	26.0	72
124	Grant et al., 1980	2658	Rat (*Rattus norvegicus*)	4	U	DR	62	d	21	d	GE	B	REP	PRWT	WO	3.00	6.0	79
125	Carson et al., 1973	3830	Sheep (*Ovis aries*)	3	U	FD	27	w	NR	NR	GE	F	REP	RSUC	WO	4.50		68
126	Dilts and Ahokas, 1980	2592	Rat (*Rattus norvegicus*)	6	U	DR	21	d	NR	NR	GE	F	REP	PRWT	WO	5.00	10.0	76
127	Sierra and Tiffany-Castiglioni, 1992	2876	Guinea pig (*Cavia porcellus*)	3	U	DR	40	d	NR	NR	GE	F	REP	PRWT	WO	5.50		73
128	Jessup and Shott, 1969	11831	Rat (*Rattus norvegicus*)	5	U	FD	92	w	21	d	JV	M	REP	TEWT	TE	7.50	74.9	78
129	Kimmel et al., 1980	2737	Rat (*Rattus norvegicus*)	4	U	DR	23.8	d	21	d	LC	F	REP	Other	WO	8.90		76
130	Kimmel et al., 1980	2737	Rat (*Rattus norvegicus*)	5	U	DR	23.8	d	21	d	GE	F	REP	Other	WO	9.10	45.0	73
131	McMurry et al., 1995	2770	Cotton rat (*Sigmodon hispidus*)	3	U	DR	7	w	NR	NR	AD	M	REP	RHIS	RT	12.4	170	67
132	Barratt et al., 1989	2524	Rat (*Rattus norvegicus*)	4	U	GV	9	w	10	w	JV	M	REP	SPCV	TE	18.0	180	85
133	Zenick et al., 1979	2943	Rat (*Rattus norvegicus*)	3	U	DR	100	d	21	d	GE	F	REP	PRWT	WO	25.4		68
134	Cerklewski, 1980	10607	Rat (*Rattus norvegicus*)	2	U	FD	35	d	70	d	LC	F	REP	PRWT	WO	27.5		66
135	Chowdhury et al., 1984	3721	Rat (*Rattus norvegicus*)	4	U	DR	60	d	NR	NR	SM	M	REP	TEWT	TE	31.6	63.2	71
136	Bull, et.. al., 1978	14812	Rat (*Rattus norvegicus*)	4	U	DR	56	d	70	d	LC	F	REP	PROG	WO	32.5		69
137	Winder et al., 1984	2934	Rat (*Rattus norvegicus*)	3	U	DR	31	d	NR	d	LC	F	REP	PRWT	WO	33.3	111	72
138	Miller et al., 1982	2775	Rat (*Rattus norvegicus*)	4	U	GV	41	d	NR	NR	GE	F	REP	PRWT	WO	41.0	54.6	87
139	Wolfe et al, 1996	2502	Rat (*Rattus norvegicus*)	5	U	DR	1	w	94	d	JV	M	REP	SPCL	SM	47.3	82.0	84
140	Sourgens et al., 1987	2889	Rat (*Rattus norvegicus*)	4	U	DR	30	d	NR	NR	SM	M	REP	Other	SV	56.0	285	73
141	Carpenter, 1982	2565	Hamster (*Mesocricetus auratus*)	2	U	DR	51	d	15	w	GE	F	REP	PROG	WO	64.8		69
142	Carpenter, 1982	2565	Hamster (*Mesocricetus auratus*)	2	U	DR	14	d	11	w	GE	F	REP	PROG	WO	64.9		67
143	Ronis et al., 1998	2847	Rat (*Rattus norvegicus*)	4	U	DR	37	d	NR	NR	GE	F	REP	PRWT	WO	90.1	270	74
144	Wardell et al., 1982	748	Rat (*Rattus norvegicus*)	5	U	GV	12	d	NR	NR	GE	F	REP	RSEM	EM	100	150	87
145	Hamilton and O'Flaherty, 1994	2670	Rat (*Rattus norvegicus*)	3	U	DR	68	d	25	d	GE	F	REP	PRWT	WO	115		72
146	Hamilton et al., 1994	2671	Rat (*Rattus norvegicus*)	4	U	DR	77	d	25	d	GE	F	REP	PRWT	WO	116		68
147	Fox et al., 1977	2633	Rat (*Rattus norvegicus*)	2	U	DR	21	d	NR	NR	LC	F	REP	PRWT	WO	120		68
148	Eyden et al, 1978	2618	Mouse (*Mus musculus*)	3	U	FD	8	w	2	mo	GE	M	REP	SPCV	TE	144	1440	78
149	Maker et al., 1973	2758	Mouse (*Mus musculus*)	7	U	FD	30	d	NR	NR	LC	F	REP	PRWT	WO	202	506	79
150	Maker et al., 1973	2758	Mouse (*Mus musculus*)	7	U	FD	30	d	NR	NR	LC	F	REP	PRWT	WO	202	506	79
151	Cramer et al, 1980	14816	Rat (*Rattus norvegicus*)	4	U	DR	21	d	NR	NR	GE	F	REP	DEYO	WO	276	552	74
152	Nathan et al., 1992	2785	Rat (*Rattus norvegicus*)	5	U	DR	10	w	NR	NR	AD	M	REP	TEWT	MT	294	587	71
153	Brady, et al, 1975	14795	Rat (*Rattus norvegicus*)	2	U	GV	102	d	30	d	GE	F	REP	PRWT	WO	441		69
154	Wenda-Rozewicka et al., 1996	2928	Rat (*Rattus norvegicus*)	2	U	DR	9	mo	NR	NR	SM	M	REP	RHIS	TE	600		66
155	Barrett and Livesey, 1983	10239	Rat (*Rattus norvegicus*)	4	U	FD	4	d	NR	NR	LC	F	REP	PRWT	WO	601	1500	86
156	Piasekand Kostial, 1987	2817	Rat (*Rattus norvegicus*)	4	U	DR	13	w	NR	NR	JV	M	REP	FERT	WO	639		66
157	Junaid et al., 1997	2725	Mouse (*Mus musculus*)	4	U	GV	60	d	NR	NR	AD	F	REP	RPRD	OV		2.00	77
158	Morris et al, 1938	15125	Rat (*Rattus norvegicus*)	3	U	FD	339	d	26-27	d	JV	B	REP	PRWT	WO		2.49	74
159	Schroeder and Mitchener, 1971	66	Rat (*Rattus norvegicus*)	2	U	DR	9	mo	21	d	JV	F	REP	DEYO	WO		2.94	67
160	Schroeder and Mitchener, 1971	66	Mouse (*Mus musculus*)	2	U	DR	6	mo	21	d	JV	F	REP	DEYO	WO		3.62	67
161	Gupta et al., 1995	2666	Mouse (*Mus musculus*)	4	U	GV	52	d	2	mo	GE	F	REP	PROG	EM		5.50	81
162	Saxena et. al. 1989	2857	Rat (*Rattus norvegicus*)	2	U	DR	120	d	1	d	GE	M	REP	SPCL	TE		6.76	69
163	Cernochova and Kamarad, 1992	2568	Mouse (*Mus musculus*)	2	U	DR	5	w	NR	NR	AD	M	REP	TEDG	TE		16.6	66
164	Al-Omar et al, 2000	20974	Mouse (*Mus musculus*)	2	M	GV	2	w	NR	NR	JV	M	REP	SPCL	SM		46.4	86
165	Winneke et al., 1977	3935	Rat (*Rattus norvegicus*)	2	U	FD	102	d	NR	NR	GE	F	REP	PROG	WO		49.6	78
166	Batra et al., 1998	2528	Rat (*Rattus norvegicus*)	2	U	GV	3	mo	8	w	SM	M	REP	TEDG	TE		50.0	81
167	Hayashi, 1983	3864	Rat (*Rattus norvegicus*)	2	U	DR	18	d	NR	NR	GE	F	REP	PRWT	WO		55.5	68
168	Kempinas et. al 1988	2733	Rat (*Rattus norvegicus*)	3	U	DR	90	d	NR	NR	AD	M	REP	SPCL	SM		61.2	69
169	Donald et al., 1981	2598	Mouse (*Mus musculus*)	2	U	DR	23	d	NR	NR	GE	F	REP	PRWT	WO		78.6	69
170	Donald et al., 1986	2599	Mouse (*Mus musculus*)	2	U	DR	62	d	NR	NR	GE	F	REP	PRWT	WO		99.8	69
171	Talcott and Koller, 1983	2906	Mouse (*Mus musculus*)	2	U	DR	18	w	6-8	w	LC	F	REP	PRWT	WO		137	69
172	Johansson and Wide, 1986	2723	Mouse (*Mus musculus*)	2	U	DR	12	w	9	w	SM	M	REP	PRFM	WO		139	74
173	Jacquet et al., 1997	2713	Mouse (*Mus musculus*)	4	U	FD	18	d	NR	NR	GE	F	REP	PRWT	WO		154	72
174	Wolfe et al, 1996	2502	Rat (*Rattus norvegicus*)	2	M	DR	4	w	99	d	JV	M	REP	SPCL	SM		171	78
175	Blanusa, et al, 1989	14750	Rat (*Rattus norvegicus*)	5	U	DR	6	w	4	mo	GE	F	REP	RHIS	WO		175	69
176	Cramer et al, 1980	14816	Rat (*Rattus norvegicus*)	2	U	DR	22	d	NR	NR	GE	F	REP	PRWT	WO		178	69
177	Sokol et al., 1985	2888	Rat (*Rattus norvegicus*)	3	U	DR	30	d	52	d	JV	M	REP	GREP	PG		198	71
178	Hallen et al., 1995	2669	Rat (*Rattus norvegicus*)	2	U	DR	13	w	NR	NR	GE	F	REP	PRWT	WO		200	73

Table 6.1 Mammalian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
Lead

Result #	Reference	Ref No.	Test Organism	# of Conc/ Doses	Method of Analyses	Route of Exposure	Exposure Duration	Duration Units	Age	Age Units	Lifestage	Sex	Effect Type	Effect Measure	Response Site	NOAEL Dose (mg/kg bw/day)	LOAEL Dose (mg/kg bw/day)	Data Evaluation Score
179	Rabe et al., 1985	13216	Rat (*Rattus norvegicus*)	2	U	DR	21	d	80	d	JV	F	REP	PRWT	WO		218	70
180	Mykkanen et al., 1980	2783	Rat (*Rattus norvegicus*)	4	U	FD	3	w	NR	NR	LC	F	REP	PRWT	WO		221	73
181	Hsu, 1980	2704	Rat (*Rattus norvegicus*)	2	U	FD	1	w	19	w	LC	F	REP	PRWT	WO		222	73
182	Mykkanen et al., 1980	2783	Rat (*Rattus norvegicus*)	4	U	FD	3	w	NR	NR	LC	F	REP	PRWT	WO		230	73
183	Alfano and Petit, 1982	2511	Rat (Rattus norvegicus)	3	U	FD	25	d	NR	NR	LC	F	REP	PRWT	WO		258	78
184	Yu et al, 1996	3939	Rat (*Rattus norvegicus*)	2	U	DR	21	d	NR	NR	LC	F	REP	PRWT	WO		330	68
185	Sokol, 1989	2887	Rat (*Rattus norvegicus*)	2	U	DR	30	d	52	d	JV	M	REP	SPCL	SM		354	69
186	Ronis et al., 1998	2845	Rat (*Rattus norvegicus*)	2	U	DR	17	d	NR	NR	GE	F	REP	PRWT	WO		360	68
187	Ronis et al., 1998	2845	Rat (*Rattus norvegicus*)	2	U	DR	24	d	NR	NR	LC	F	REP	PRWT	WO		360	68
188	Ronis et al., 1996	2846	Rat (*Rattus norvegicus*)	2	U	DR	12	d	NR	NR	GE	F	REP	PRWT	WO		362	69
189	Sokol, 1989	2887	Rat (*Rattus norvegicus*)	2	U	DR	30	d	27	d	JV	M	REP	SPCL	SM		364	69
190	Pinon-Lataillade et al., 1995	2821	Mouse (*Mus musculus*)	2	U	DR	44	d	NR	NR	GE	F	REP	PRWT	WO		381	68
191	Draski et al., 1989	3719	Mouse (*Mus musculus*)	2	U	DR	14	d	NR	NR	LC	F	REP	PRWT	WO		381	68
192	Ronis et al., 1996	2846	Rat (*Rattus norvegicus*)	2	U	DR	50	d	24	d	JV	F	REP	RBEH	WO		381	69
193	Rasile et. al. 1995	2836	Mouse (*Mus musculus*)	2	U	DR	45	d	50-100	d	GE	F	REP	ODVP	WO		404	69
194	Thoreux-Manlay et al., 1995	2909	Rat (*Rattus norvegicus*)	2	U	DR	22	d	NR	NR	GE	F	REP	PRWT	WO		420	68
195	Donald et al., 1987	2597	Mouse (*Mus musculus*)	2	U	DR	48	d	NR	NR	GE	F	REP	PRWT	WO		437	70
196	Marchlewicz et al., 1993	2760	Rat (*Rattus norvegicus*)	2	U	DR	9	mo	3	mo	SM	M	REP	SPCL	TE		579	69
197	Piasecka et. al. 1995	2816	Rat (*Rattus norvegicus*)	2	U	DR	9	mo	NR	NR	SM	M	REP	TEDG	TE		600	69
198	Piasek et al, 1988	14751	Rat (*Rattus norvegicus*)	2	U	DR	3	w	14	w	LC	F	REP	PRWT	WO		635	69
199	Jacquet, 1977	2711	Mouse (*Mus musculus*)	2	U	FD	7	d	NR	NR	GE	F	REP	RSUC	EM		646	73
200	Selvin-Testa et. al. 1997	2869	Rat (*Rattus norvegicus*)	2	U	DR	126	d	1	d	GE	F	REP	PROG	WO		651	66
201	Piasek and Kostial 1991	2818	Rat (*Rattus norvegicus*)	2	U	DR	20	w	10	w	GE	F	REP	PRWT	WO		750	73
202	Epstein, et.al. 1991	2614	Mouse (*Mus musculus*)	2	U	DR	4	d	NR	NR	LC	F	REP	PRWT	WO		762	68
203	Holtzman et al., 1981	2698	Rat (*Rattus norvegicus*)	2	U	FD	2	w	NR	NR	LC	F	REP	PRWT	WO		828	78
204	Holtzman et al, 1978	2699	Rat (*Rattus norvegicus*)	2	U	FD	7	d	NR	NR	LC	F	REP	PRWT	WO		833	78
205	Barlow et al., 1977	2523	Rat (*Rattus norvegicus*)	2	U	FD	21	d	NR	NR	LC	F	REP	PRWT	WO		991	74
206	Gulati et al, 1985	2837	Mouse (*Mus musculus*)	4	M	DR	18	w	11	w	JV	F	REP	TEWT	WO		1370	75
207	McConnell and Berry, 1979	2767	Rat (*Rattus norvegicus*)	2	U	FD	30	d	NR	NR	LC	F	REP	PRWT	WO		1770	73
208	Sharma and Kanwar, 1985	2871	Mouse (*Mus musculus*)	2	U	DR	14	w	NR	NR	GE	B	REP	PROG	WO		1990	70
209	Goldstein et al, 1974	14824	Rat (*Rattus norvegicus*)	2	U	FD	16	d	NR	NR	LC	F	REP	PROG	WO		2570	78
210	Holtzman et al, 1980	14827	Rat (*Rattus norvegicus*)	2	U	FD	7	d	NR	NR	LC	F	REP	PRWT	WO		2570	78
211	Krigman et al., 1974	2741	Rat (*Rattus norvegicus*)	2	U	FD	25	d	NR	NR	LC	F	REP	PRWT	WO		2570	78
212	Pentschew and Garro 1966	2811	Rat (*Rattus norvegicus*)	M	FD	27	d	NR	NR	LC	F	C	REP	PROG	WO		2840	78
213	Sharma and Kanwar, 1985	2871	Mouse (*Mus musculus*)	2	U	DR	14	w	21	d	JV	B	REP	PROG	WO		3630	70
214	Michaelson and Sauerhoff, 1974	2774	Rat (*Rattus norvegicus*)	2	U	FD	17	d	NR	NR	LC	F	REP	PRWT	WO		6170	74
			Growth															
215	Willoughby et al., 1972	14386	Horse (*Equus caballus*)	2	U	FD	15	w	20 to 21	w	JV	M	GRO	BDWT	WO	0.150		68
216	Fox et.al., 1982	2634	Rat (*Rattus norvegicus*)	2	U	FD	21	d	0	d	JV	F	GRO	BDWT	WO	0.500		67
217	Dilts and Ahokas, 1979	2593	Rat (*Rattus norvegicus*)	6	U	DR	21	d	NR	NR	GE	F	GRO	BDWT	WO	1.00	5.00	72
218	Kimmel et al., 1980	2737	Rat (*Rattus norvegicus*)	5	U	DR	7	d	50	d	AD	F	GRO	BDWT	WO	1.27	13.0	73
219	Lynch et al, 1975	14380	Cattle (*Bos taurus*)	4	U	OR	7	w	1	w	JV	M	GRO	BDWT	WO	1.99		75
220	Wiebe and Barr, 1988	2930	Rat (*Rattus norvegicus*)	3	U	DR	14	d	21	d	JV	F	GRO	BDWT	WO	2.40		72
221	Schroeder et al, 1963	14446	Rat (*Rattus norvegicus*)	2	U	DR	332	d	28	d	JV	B	GRO	BDWT	WO	2.98		66
222	Kimmel et al., 1980	2737	Rat (*Rattus norvegicus*)	4	U	DR	7	w	21	d	GE	F	GRO	BDWT	WO	4.70	8.90	80
223	Horwitt and Cowgill, 1937	3873	Dog (*Canis familiaris*)	3	M	FD	7	mo	NR	NR	JV	NR	GRO	BDWT	WO	4.71		68
224	Zheng et al., 1996	2944	Rat (*Rattus norvegicus*)	3	U	DR	30	d	22-24	d	JV	M	GRO	BDWT	WO	5.64	28.2	71
225	Hammond et al., 1989	2675	Rat (*Rattus norvegicus*)	4	U	DR	23	d	22	d	JV	F	GRO	BDWT	WO	5.80	29.0	73
226	Lynch et al., 1976	3711	Cattle (*Bos taurus*)	3	U	OR	84	d	NR	NR	JV	M	GRO	BDWT	WO	7.79		80
227	Rader et al., 1981	2830	Rat (*Rattus norvegicus*)	2	U	OR	6	w	NR	NR	AD	M	GRO	BDWT	WO	9.10		67
228	Nehru et al., 1997	2788	Rat (*Rattus norvegicus*)	2	U	GV	8	w	NR	NR	JV	F	GRO	BDWT	WO	10.0		78
229	Gruber et al., 1997	2660	Rat (*Rattus norvegicus*)	3	U	DR	6	mo	NR	NR	AD	M	GRO	BDWT	WO	10.6	532	69
230	Lorenzo et al., 1978	2751	Rabbit (*Oryctolagus cuniculus*)	3	U	GV	10	d	1	d	JV	F	GRO	BDWT	WO	10.7	50.4	78
231	El-Gazzar et al, 1978	21143	Rat (*Rattus norvegicus*)	2	U	DR	140	d	21	d	JV	M	GRO	BDWT	WO	10.7		67
232	Rader et al., 1981	2830	Rat (*Rattus norvegicus*)	2	U	DR	6	w	NR	NR	JV	M	GRO	BDWT	WO	15.1		71
233	Mahaffey et al., 1977	14580	Rat (*Rattus norvegicus*)	2	UX	FD	10	w	NR	NR	JV	M	GRO	BDWT	WO	15.4		79
234	Rader et al., 1981	2830	Rat (*Rattus norvegicus*)	2	U	OR	6	w	NR	NR	AD	M	GRO	BDWT	WO	15.5		74
235	Rader et. al. 1981	2829	Rat (*Rattus norvegicus*)	2	U	DR	7	w	NR	NR	JV	M	GRO	BDWT	WO	16.1		71
236	Gerber et al, 1978	14822	Mouse (*Mus musculus*)	3	U	DR	14	d	0	d	JV	NR	GRO	BDWT	WO	16.3	163	71
237	Barratt et al., 1989	2524	Rat (*Rattus norvegicus*)	4	U	GV	9	w	10	w	JV	M	GRO	BDWT	WO	18.0	180	83
238	Morris et al, 1938	15125	Rat (*Rattus norvegicus*)	3	U	FD	339	d	26-27	d	JV	B	GRO	BDWT	WO	18.3		72
239	Tafelski and Lamperti, 1975	2905	Rat (*Rattus norvegicus*)	4	U	GV	29	d	NR	NR	SM	F	GRO	BDWT	WO	18.9		71

Table 6.1 Mammalian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
Lead

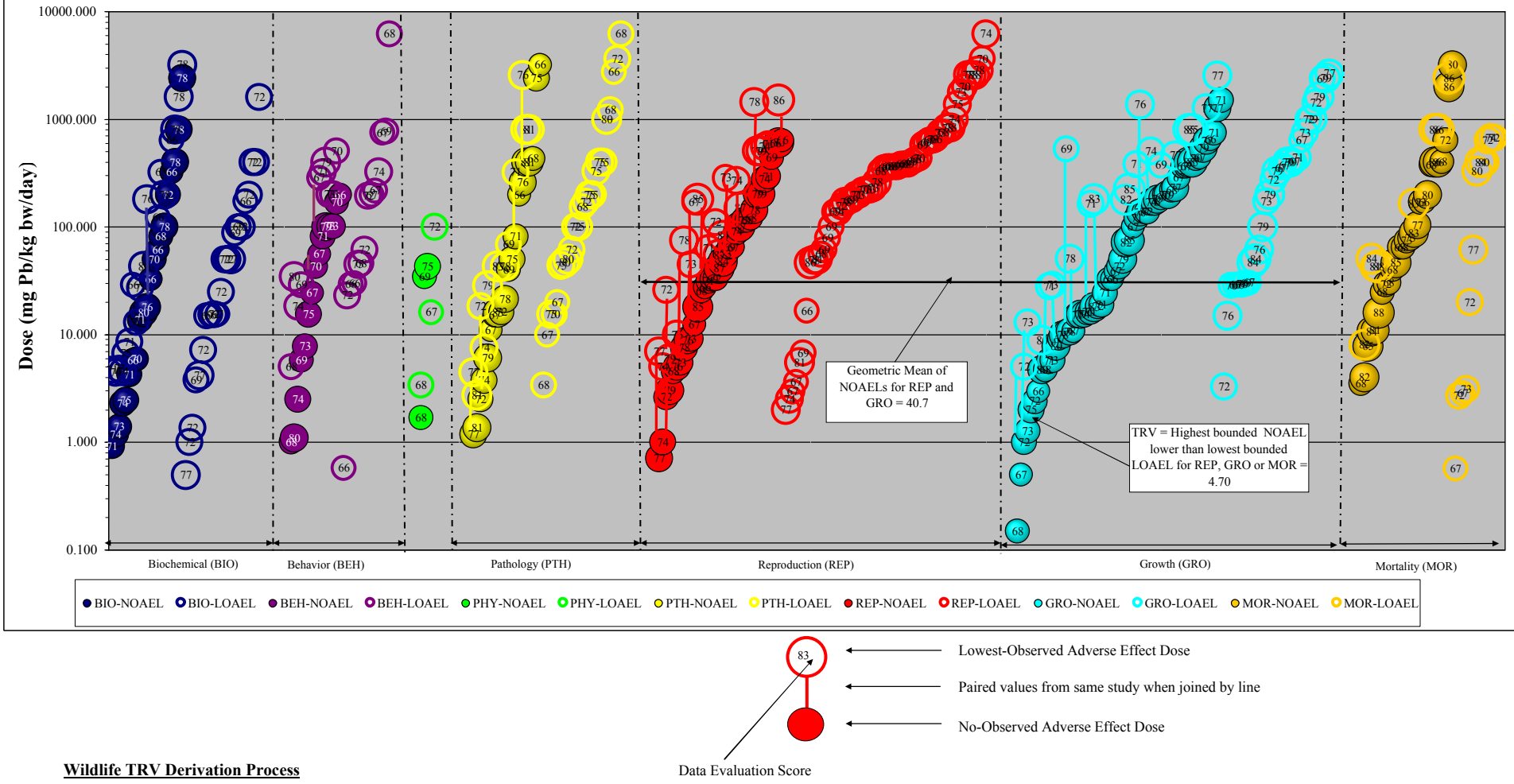
Result #	Reference	Ref No.	Test Organism	# of Conc/ Doses	Method of Analyses	Route of Exposure	Exposure Duration	Duration Units	Age	Age Units	Lifestage	Sex	Effect Type	Effect Measure	Response Site	NOAEL Dose (mg/kg bw/day)	LOAEL Dose (mg/kg bw/day)	Data Evaluation Score
240	Mahaffey et al., 1973	2756	Rat (*Rattus norvegicus*)	7	U	DR	10	w	NR	NR	JV	M	GRO	BDWT	WO	24.3		71
241	Bull, et.. al., 1978	14812	Rat (*Rattus norvegicus*)	4	U	DR	56	d	70	d	LC	F	GRO	BDWT	WO	32.5		67
242	Fick et al., 1976	3704	Sheep (*Ovis aries*)	5	U	FD	84	d	NR	NR	JV	M	GRO	BDWT	WO	32.7		66
243	Bankowska and Hine, 1985	14852	Rat (*Rattus norvegicus*)	2	U	DR	10	w	NR	NR	JV	M	GRO	BDWT	WO	38.5		67
244	Logner et al., 1984	3889	Cattle (*Bos taurus*)	4	U	FD	7	w	16	w	JV	M	GRO	BDWT	WO	43.0		72
245	Agodi et al., 1990	2507	Rat (*Rattus norvegicus*)	2	U	GV	28	d	2	d	JV	B	GRO	BDWT	WO	50.0		79
246	Wolfe et al, 1996	2502	Rat (*Rattus norvegicus*)	5	M	DR	4	w	94	d	JV	M	GRO	BDWT	WO	71.5	178	82
247	Gelman and Michaelson, 1979	14821	Rat (*Rattus norvegicus*)	4	U	GV	12	d	2	d	JV	B	GRO	BDWT	WO	75.0	225	85
248	Rudra Pal et al., 1975	2806	Rat (*Rattus norvegicus*)	2	U	FD	4	w	NR	NR	JV	M	GRO	BDWT	WO	100		67
249	Goyer et al., 1970	14799	Rat (*Rattus norvegicus*)	6	U	DR	10	w	NR	NR	JV	M	GRO	BDWT	WO	120	383	71
250	Eyden et al, 1978	2618	Mouse (*Mus musculus*)	3	U	FD	4	w	3	mo	JV	B	GRO	BDWT	WO	136	1360	76
251	Talcott and Koller, 1983	2906	Mouse (*Mus musculus*)	2	U	DR	18	w	6-8	w	LC	F	GRO	BDWT	WO	137		67
252	Johansson and Wide, 1986	2723	Mouse (*Mus musculus*)	2	U	DR	12	w	NR	NR	GE	M	GRO	BDWT	WO	139		72
253	Sokol et al., 1985	2888	Rat (*Rattus norvegicus*)	3	U	DR	30	d	52	d	JV	M	GRO	BDWT	WO	169	508	74
254	Wolfe et al, 1996	2502	Rat (*Rattus norvegicus*)	2	M	DR	4	w	99	d	JV	B	GRO	BDWT	WO	171		76
255	Kishi et al., 1983	12025	Rat (*Rattus norvegicus*)	4	U	GV	18	d	3	d	JV	M	GRO	BDWT	WO	180		79
256	Wadi and Ahmad, 1999	2924	Mouse (*Mus musculus*)	3	U	DR	6	w	7	w	SM	M	GRO	BDWT	WO	187	373	69
257	Petrusz et al., 1979	2815	Rat (*Rattus norvegicus*)	4	U	GV	18	d	2	d	JV	B	GRO	BDWT	WO	200		70
258	Yagminas et al., 1990	3937	Rat (*Rattus norvegicus*)	2	U	GV	91	d	NR	NR	JV	M	GRO	BDWT	WO	200		79
259	Rabe et al., 1985	13216	Rat (*Rattus norvegicus*)	2	U	DR	21	d	80	d	JV	F	GRO	BDWT	WO	218		68
260	Mykkanen et al., 1980	2783	Rat (*Rattus norvegicus*)	4	U	FD	1	w	NR	NR	LC	F	GRO	BDWT	WO	230	460	77
261	Sourgens et al., 1987	2889	Rat (*Rattus norvegicus*)	4	U	DR	30	d	NR	NR	JV	M	GRO	BDWT	WO	285		67
262	Exon et al., 1979	3847	Mouse (*Mus musculus*)	5	U	DR	10	w	NR	NR	JV	M	GRO	BDWT	WO	362		67
263	Sokol, 1989	2887	Rat (*Rattus norvegicus*)	2	U	DR	30	d	52	d	JV	M	GRO	BDWT	WO	364		67
264	Holtzman et al., 1982	2697	Rat (*Rattus norvegicus*)	4	U	GV	14	d	14	d	JV	NR	GRO	BDWT	WO	400	800	85
265	Holtzman et al., 1982	2697	Rat (*Rattus norvegicus*)	5	U	GV	14	d	20	d	JV	NR	GRO	BDWT	WO	400	800	85
266	Gerber et al, 1978	14822	Rat (*Rattus norvegicus*)	2	U	FD	14	mo	0	d	JV	NR	GRO	BDWT	WO	431		70
267	Brady, et al, 1975	14795	Rat (*Rattus norvegicus*)	2	U	GV	102	d	30	d	LC	F	GRO	BDWT	WO	441		67
268	Stewart et al., 1998	2896	Mouse (*Mus musculus*)	4	U	GV	12	d	6	d	JV	M	GRO	BDWT	WO	534		79
269	Maker et al., 1973	2758	Mouse (*Mus musculus*)	7	U	FD	30	d	NR	NR	LC	F	GRO	BDWT	WO	632	1264	77
270	Selvin-Testa et. al. 1997	2869	Rat (*Rattus norvegicus*)	2	U	DR	126	d	1	d	GE	F	GRO	BDWT	WO	651		66
271	Piasek and Kostial 1991	2818	Rat (*Rattus norvegicus*)	2	U	DR	20	w	10	w	GE	F	GRO	BDWT	WO	750		71
272	Maker et al., 1973	2758	Mouse (*Mus musculus*)	7	U	FD	28	d	NR	NR	LC	F	GRO	BDWT	WO	1260	2530	77
273	Barrett and Livesey, 1983	10239	Rat (*Rattus norvegicus*)	4	U	FD	18	d	NR	NR	LC	F	GRO	BDWT	WO	1500		71
274	Schroeder et al, 1970	252	Rat (*Rattus norvegicus*)	2	U	DR	9	d	21	d	JV	M	GRO	BDWT	WO		3.30	72
275	Kelliher, et al. 1973	14377	Cattle (*Bos taurus*)	2	U	FD	283	d	7	mo	JV	M	GRO	BDWT	WO		15.0	76
276	Hamilton and O'Flaherty, 1994	2670	Rat (*Rattus norvegicus*)	3	U	DR	92	d	25	d	GE	F	MPH	GMPH	TB		28.7	70
277	Hamilton et al., 1994	2671	Rat (*Rattus norvegicus*)	4	U	DR	7	d	25	d	GE	F	GRO	BDWT	WO		29.0	66
278	Hammond and Succop, 1995	2678	Rat (*Rattus norvegicus*)	2	U	DR	5	d	26	d	JV	F	GRO	BDWT	WO		29.0	66
279	Hammond et al., 1993	2677	Rat (*Rattus norvegicus*)	2	U	DR	26	d	22	d	JV	F	GRO	BDWT	WO		29.5	70
280	Hammond et al., 1993	2677	Rat (*Rattus norvegicus*)	2	U	DR	14	d	26	d	JV	F	MPH	Other	TA		29.9	69
281	Minnema and Hammond, 1994	2776	Rat (*Rattus norvegicus*)	2	U	DR	10	d	26	d	JV	F	GRO	BDWT	WO		30.4	67
282	Al-Omar et al, 2000	20974	Mouse (*Mus musculus*)	2	M	GV	3	w	NR	NR	JV	M	GRO	BDWT	WO		46.4	84
283	White, 1977	2929	Dog (*Canis familiaris*)	2	U	OR	5	w	<1	yr	JV	NR	GRO	BDWT	WO		50.0	84
284	Pankakoski et al., 1994	2807	Shrew (*Sorex araneus*)	4	M	FD	31	d	NR	NR	JV	B	GRO	BDWT	WO		61.5	76
285	Shailesh Kumar and Desiraju, 1990	2870	Rat (*Rattus norvegicus*)	3	U	GV	58	d	2	d	JV	B	GRO	BDWT	WO		100	79
286	Hsu et al, 1975	14376	Pig (*Sus scrofa*)	2	U	FD	13	w	4	w	JV	NR	GRO	BDWT	WO		173	73
287	Harry et al., 1985	2680	Rat (*Rattus norvegicus*)	2	U	GV	29	d	2	d	JV	F	GRO	BDWT	WO		200	79
288	Lessler and Wright, 1976	2750	Rat (*Rattus norvegicus*)	2	U	FD	5	w	NR	NR	MA	NR	GRO	BDWT	WO		272	72
289	Press 1975	2827	Rat (*Rattus norvegicus*)	2	U	GV	6	d	1	d	JV	B	GRO	BDWT	WO		328	79
290	Sokol, 1989	2887	Rat (*Rattus norvegicus*)	2	U	DR	30	d	27	d	JV	M	GRO	BDWT	WO		354	67
291	Ronis et al., 1996	2846	Rat (*Rattus norvegicus*)	2	U	DR	50	d	24	d	JV	M	GRO	BDWT	WO		371	67
292	Toews et al., 1983	2911	Rat (*Rattus norvegicus*)	2	U	GV	28	d	2	d	JV	M	GRO	BDWT	WO		400	79
293	Holtzman et al., 1982	2697	Rat (*Rattus norvegicus*)	4	U	GV	14	d	18	d	JV	NR	GRO	BDWT	WO		400	79
294	Rasile et. al. 1995	2836	Mouse (*Mus musculus*)	2	U	DR	45	d	50-100	d	GE	F	GRO	BDWT	WO		404	67
295	Mykkanen et al., 1980	2783	Rat (*Rattus norvegicus*)	4	U	FD	1	w	NR	NR	LC	F	GRO	BDWT	WO		442	71
296	Piasek et al, 1988	14751	Rat (*Rattus norvegicus*)	2	U	DR	6	w	14	w	LC	F	GRO	BDWT	WO		638	67
297	Gulati et al, 1985	2837	Mouse (*Mus musculus*)	4	M	DR	10	w	11	w	JV	F	GRO	BDWT	WO		748	73
298	Barlow et al., 1977	2523	Rat (*Rattus norvegicus*)	2	U	FD	21	d	NR	NR	LC	F	GRO	BDWT	WO		991	72
299	Brashear et al., 1978	2546	Rat (*Rattus norvegicus*)	2	U	GV	18	d	2	d	JV	B	GRO	BDWT	WO		1000	79
300	Gerber et al, 1978	14822	Rat (*Rattus norvegicus*)	2	U	FD	2	w	0	d	JV	NR	GRO	BDWT	WO		1430	72
301	Holtzman et al., 1982	2697	Rat (*Rattus norvegicus*)	4	U	GV	14	d	24	d	JV	NR	GRO	BDWT	WO		1600	79

Table 6.1 Mammalian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
Lead

Result #	Reference	Ref No.	Test Organism	# of Conc/ Doses	Method of Analyses	Route of Exposure	Exposure Duration	Duration Units	Age	Age Units	Lifestage	Sex	Effect Type	Effect Measure	Response Site	NOAEL Dose (mg/kg bw/day)	LOAEL Dose (mg/kg bw/day)	Data Evaluation Score
302	Holtzman et al., 1981	2698	Rat (*Rattus norvegicus*)	2	U	FD	2	w	60-80	d	JV	M	GRO	BDWT	WO		2390	69
303	Holtzman et al., 1982	2697	Rat (*Rattus norvegicus*)	3	U	GV	14	d	16	d	JV	NR	GRO	BDWT	WO		2400	79
304	Holtzman et al, 1980	14827	Rat (*Rattus norvegicus*)	2	U	FD	14	d	60	d	JV	M	GRO	BDWT	WO		2650	77
								Survival										
305	Schroeder and Mitchener, 1975	1858	Mouse (*Mus musculus*)	2	U	DR	669	d	19-20	d	JV	B	MOR	LFSP	WO	3.50		68
306	Junaid et al., 1997	2725	Mouse (*Mus musculus*)	4	U	GV	60	d	NR	NR	AD	F	MOR	MORT	WO	4.00	8.00	82
307	Lynch et al., 1976	3711	Cattle (*Bos taurus*)	3	U	OR	84	d	NR	NR	JV	M	MOR	SURV	WO	7.79		85
308	Lorenzo et al., 1978	2751	Rabbit (*Oryctolagus cuniculus*)	5	U	GV	30	d	1	d	JV	F	MOR	MORT	WO	10.7	50.4	84
309	Azar et al., 1973	3747	Rat (*Rattus norvegicus*)	5	M	FD	2	yr	NR	NR	NR	M	MOR	MORT	WO	10.9	42.4	81
310	Logner et al., 1984	3889	Cattle (*Bos taurus*)	4	U	FD	10	d	74	d	JV	M	MOR	MORT	WO	16.0	43.0	88
311	Azar et al., 1973	3747	Dog (*Canis familiaris*)	5	M	FD	2	yr	NR	NR	NR	B	MOR	MORT	WO	24.7		68
312	Jessup, 1967	2720	Rabbit (*Oryctolagus cuniculus*)	3	U	FD	10	d	NR	NR	GE	F	MOR	MORT	WO	29.2		72
313	Lassen and Buck, 1979	3709	Pig (*Sus scrofa*)	5	U	DR	13	w	6	w	JV	NR	MOR	MORT	WO	30.2		68
314	Bankowska and Hine, 1985	14852	Rat (*Rattus norvegicus*)	2	U	DR	4	w	NR	NR	JV	M	MOR	MORT	WO	40.3		68
315	Al-Omar et al, 2000	20974	Mouse (*Mus musculus*)	2	M	GV	5	w	NR	NR	JV	M	MOR	MORT	WO	46.4		85
316	Carpenter, 1982	2565	Hamster (*Mesocricetus auratus*)	2	U	DR	51	d	15	w	GE	F	MOR	MORT	WO	64.8		68
317	Carpenter, 1982	2565	Hamster (*Mesocricetus auratus*)	2	U	DR	14	d	11	w	GE	F	MOR	MORT	WO	64.9		68
318	Jessup and Shott, 1969	11831	Rat (*Rattus norvegicus*)	5	U	FD	92	w	21	d	JV	M	MOR	SURV	WO	74.9		73
319	Jessup, 1969	2721	Rat (*Rattus norvegicus*)	4	U	FD	8	w	NR	NR	GE	B	MOR	SURV	WO	78.9		73
320	Azar et al., 1973	3747	Rat (*Rattus norvegicus*)	3	M	FD	2	yr	NR	NR	NR	M	MOR	MORT	WO	87.5	163	83
321	Wolfe et al, 1996	2502	Rat (*Rattus norvegicus*)	5	U	DR	24	w	94	d	JV	B	MOR	MORT	WO	104		77
322	Lessler and Wright, 1976	2750	Rat (*Rattus norvegicus*)	2	U	FD	24	w	NR	NR	YO	M	MOR	MORT	WO	170		73
323	Lessler and Wright, 1976	2750	Rat (*Rattus norvegicus*)	2	U	FD	8	w	NR	NR	MA	M	MOR	MORT	WO	170		66
324	Petrusz et al., 1979	2815	Rat (*Rattus norvegicus*)	4	U	GV	18	d	2	d	JV	B	MOR	MORT	WO	200		80
325	Ogilvie and Martin, 1981	2799	Mouse (*Mus musculus*)	2	U	DR	10	mo	NR	NR	AD	M	MOR	MORT	WO	379		68
326	Holtzman et al., 1982	2697	Rat (*Rattus norvegicus*)	5	U	GV	14	d	20	d	JV	NR	MOR	MORT	WO	400	800	86
327	Holtzman et al., 1982	2697	Rat (*Rattus norvegicus*)	4	U	GV	14	d	24	d	JV	NR	MOR	MORT	WO	400	800	86
328	Rasile et. al. 1995	2836	Mouse (*Mus musculus*)	2	U	DR	98	d	50-100	d	GE	F	MOR	MORT	WO	404		68
329	Piasekand Kostial, 1987	2817	Rat (*Rattus norvegicus*)	4	U	DR	18	w	NR	NR	JV	M	MOR	MORT	WO	639		72
330	Holtzman et al., 1982	2697	Rat (*Rattus norvegicus*)	4	U	GV	14	d	24	d	JV	NR	MOR	MORT	WO	2000	2400	86
331	Holtzman et al., 1982	2697	Rat (*Rattus norvegicus*)	3	U	GV	14	d	14	d	JV	NR	MOR	MORT	WO	3200		80
332	Kanisawa and Schroeder, 1969	3701	Rat (*Rattus norvegicus*)	2	U	DR	727	d	30	d	JV	F	MOR	LFSP	WO		0.569	67
333	Zmudski et al., 1983	3940	Cattle (*Bos taurus*)	4	U	DR	21	d	10	w	JV	M	MOR	MORT	WO		2.70	72
334	Schroeder et al, 1963	14446	Rat (*Rattus norvegicus*)	2	U	DR	6	mo	28	d	JV	B	MOR	SURV	WO		2.87	67
335	Schroeder et al, 1964	14447	Mouse (*Mus musculus*)	2	U	DR	21	mo	21	d	JV	M	MOR	SURV	WO		3.10	73
336	Wells, et.al, 1986	14803	Cattle (*Bos taurus*)	2	U	DR	8	d	3	mo	JV	M	MOR	MORT	WO		20.0	72
337	Pankakoski et al., 1994	2807	Shrew (*Sorex araneus*)	4	M	FD	31	d	NR	NR	JV	B	MOR	MORT	WO		61.5	77
338	Press 1975	2827	Rat (*Rattus norvegicus*)	2	U	GV	14	d	1	d	JV	B	MOR	MORT	WO		328	80
339	Shailesh Kumar and Desiraju, 1990	2870	Rat (*Rattus norvegicus*)	2	U	GV	58	d	2	d	JV	B	MOR	MORT	WO		400	84
340	Holtzman et al., 1982	2697	Rat (*Rattus norvegicus*)	4	U	GV	14	d	16	d	JV	NR	MOR	MORT	WO		400	80
341	Eyden et al, 1978	2618	Mouse (*Mus musculus*)	6	U	FD	115	d	NR	NR	AD	B	MOR	SURV	WO		635	72
342	Gulati et al, 1985	2837	Mouse (*Mus musculus*)	4	M	DR	18	w	11	w	JV	B	MOR	MORT	WO		670	74
343	Lamb et al., 1997	2505	Mouse (*Mus musculus*)	4	U	DR	105	d	6	w	JV	B	MOR	MORT	WO		670	72

ACTP = accuracy of learned behavior; ACTV = activity level; AD = adult; ALAD =(delta) -aminolevulinic acid dehydrogenase; AVO = avoidance; B = both; B2MG = beta2-microglobulin; BL = blood; BLPR = blood pressure; BDWT = body weight changes; BEH = behavior; BR = brain; BTMP = body temperature; BUNT = blood urea nitrogen; CALC = calcium; CHM = chemical changes;d = days; DEYO = death of young; DHYD = dehdyration; DOPA = dopamine; DR = Drinking water; EDMA = edema; EM = embryo; ENCP = encephalopathy; ENZ = enyzme level changes; EXCR = excretion; EY = eye; F = female; FCNS = food consumption; FD = food; FDB = feeding behavior; FERT = fertility; FOOD = food avoidance; G6PD = glucose-6-phosphate dehydrogenase; GBCM = general biochemical; GE = gestation; GHIS = general histology; GLSN = gross lesions; GMPH = general morphology; GPHY = general physiology; GREP = general reproductive effect; GRO = growth; GRS = gross body weight changes; GV = gavage; HE = heart; HIS = histological changes; HMCT = hematocrit; HMGL = hemoglobin; HRM = hormone changes; IIBD = intranuclear inclusion bodies; ITX = intoxication; JV = juvenile; kg = kilograms; KI = kidney; L = liter; LC = lactation; LFSP = lifespan; LI = liver; LOAEL = lowest observed adverse effect level; mo = months; M = male; M = measured; MA = mature; MOR = effects on mortality and survival; MORT = mortality; MT = multiple tissues/organs; NCRO = necrosis; NE = nervous tissue; NOAEL = No Observed Advese Effect Level; NORE = norephinephrine; NR = Not reported; ODVP = offspring development; OR = other oral; ORW = organ weight changes; ORWT = organ weight changes; OV = ovaries; PARL = paralysis; PCLV = packed cell volume; PG = prostate gland; PHY = physiology; PI = pituitary gland; POTA = potassium; PRFM = sexual performance; PROG = progeny numbers/counts; PRTL = total protein; PRWT = progeny weight; PTH = pathology; RBCE = red blood cell count; RBEH = reproductive behavior; REP = reproduction; RHIS = reproductive organ histology; RPRD = reproductive capacity; RRSP = righting response; RSEM = resorbed embryos; RSUC = reproductive success (general); RT = reproductive tissue; SCDH = succinate dehydrogenase; SM = sperm; SM = sexually mature; SMIX = weight relative to body weight; SOMC = somatomedin C; SPCL = sperm cell counts; SPCV = sperm cell viability; SR = serum; SURV = survival; SV = seminal vesicle; TA = tail; TB = tibia;TE = testes; TEDG = testes degeneration; TEWT = testes weight; U = unmeasured; UR = urine; USTR = ultrastructural changes; UX = measured but values not reported; w = weeks; WCON = water consumption; WO = whole organism; YO = young; yr = year.

Figure 6.1 Mammalian TRV Derivation for Lead



Wildlife TRV Derivation Process

1) There are at least three results available for two test species within the growth, reproduction, and mortality effect groups. There are enough data to derive a TRV.

2) There are three NOAEL results available for calculation of a geometric mean.

4) The geometric mean is equal to 40.7 mg/kg bw/d but is higher than the lowest bounded LOAEL for results within the reproduction, growth, and survival effect groups.

5) The mammalian wildlife TRV for lead is equal to 4.70 mg lead/kg bw/day which is the highest bounded NOAEL below the lowest bounded LOAEL for results in the growth, reproduction, and survival effect groups.

Table 6.2 Calculation of the Mammalian Eco-SSLs for Lead					
Surrogate Receptor Group	**TRV for Lead (mg dw/kg bw/d) [1]**	**Food Ingestion Rate (FIR)[2] (kg dw/kg bw/d)**	**Soil Ingestion as Proportion of Diet (P_s)[2]**	**Concentration of Lead in Biota Type (i)[2,3] (B_i) (mg/kg dw)**	**Eco-SSL (mg/kg dw)[4]**
Mammalian herbivore (vole)	4.70	0.0875	0.032	$\ln(B_i) = 0.561 * \ln(Soil_j) - 1.328$ where i = plants	1200
Mammalian ground insectivore (shrew)	4.70	0.209	0.030	$\ln(B_i) = 0.807 * \ln(Soil_j) - 0.218$ where i = earthworms	56
Mammalian carnivore (weasel)	4.70	0.130	0.043	$\ln(B_i) = 0.4422 * \ln(Soil_j) + 0.0761$ where i = mammals	460

[1] The process for derivation of wildlife TRVs is described in Attachment 4-5 of U.S. EPA (2003).
[2] Parameters (FIR, P_s, B_i values, regressions) are provided in U.S. EPA (2003) Attachment 4-1 (revised February 2005).
[3] B_i = Concentration in biota type (i) which represents 100% of the diet for the respective receptor.
[4] $HQ = FIR * (Soil_j * P_s + B_i) / TRV$ solved for HQ=1 where $Soil_j$ = Eco-SSL (Equation 4-2; U.S. EPA, 2003).
NA = Not Applicable

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Literature Rejection Categories		
Rejection Criteria	**Description**	**Receptor**
ABSTRACT (Abstract)	Abstracts of journal publications or conference presentations.	Wildlife Plants and Soil Invertebrates
ACUTE STUDIES (Acu)	Single oral dose or exposure duration of three days or less.	Wildlife
AIR POLLUTION (Air P)	Studies describing the results for air pollution studies.	Wildlife Plants and Soil Invertebrates
ALTERED RECEPTOR (Alt)	Studies that describe the effects of the contaminant on surgically-altered or chemically-modified receptors (e.g., right nephrectomy, left renal artery ligature, hormone implant, etc.).	Wildlife
AQUATIC STUDIES (Aquatic)	Studies that investigate toxicity in aquatic organisms.	Wildlife Plants and Soil Invertebrates
ANATOMICAL STUDIES (Anat)	Studies of anatomy. Instance where the contaminant is used in physical studies (e.g., silver nitrate staining for histology).	Wildlife
BACTERIA (Bact)	Studies on bacteria or susceptibility to bacterial infection.	Wildlife Plants and Soil Invertebrates
BIOACCUMULATION SURVEY (Bio Acc)	Studies reporting the measurement of the concentration of the contaminant in tissues.	Wildlife Plants and Soil Invertebrates
BIOLOGICAL PRODUCT (BioP)	Studies of biological toxicants, including venoms, fungal toxins, *Bacillus thuringiensis*, other plant, animal, or microbial extracts or toxins.	Wildlife Plants and Soil Invertebrates
BIOMARKER (Biom)	Studies reporting results for a biomarker having no reported association with an adverse effect and an exposure dose (or concentration).	Wildlife
CARCINOGENICITY STUDIES (Carcin)	Studies that report data only for carcinogenic endpoints such as tumor induction. Papers that report systemic toxicity data are retained for coding of appropriate endpoints.	Wildlife Plants and Soil Invertebrates
CHEMICAL METHODS (Chem Meth)	Studies reporting methods for determination of contaminants, purification of chemicals, etc. Studies describing the preparation and analysis of the contaminant in the tissues of the receptor.	Wildlife Plants and Soil Invertebrates
CONFERENCE PROCEEDINGS (CP)	Studies reported in conference and symposium proceedings.	Wildlife Plants and Soil Invertebrates
DEAD (Dead)	Studies reporting results for dead organisms. Studies reporting field mortalities with necropsy data where it is not possible to establish the dose to the organism.	Wildlife Plants and Soil Invertebrates
DISSERTATIONS (Diss)	Dissertations are excluded. However, dissertations are flagged for possible future use.	Wildlife
DRUG (Drug)	Studies reporting results for testing of drug and therapeutic effects and side-effects. Therapeutic drugs include vitamins and minerals. Studies of some minerals may be included if there is potential for adverse effects.	Wildlife Plants and Soil Invertebrates
DUPLICATE DATA (Dup)	Studies reporting results that are duplicated in a separate publication. The publication with the earlier year is used.	Wildlife Plants and Soil Invertebrates

Literature Rejection Categories		
Rejection Criteria	**Description**	**Receptor**
ECOLOGICAL INTERACTIONS (Ecol)	Studies of ecological processes that do not investigate effects of contaminant exposure (e.g., studies of "silver" fox natural history; studies on ferrets identified in iron search).	Wildlife Plants and Soil Invertebrates
EFFLUENT (Effl)	Studies reporting effects of effluent, sewage, or polluted runoff.	Wildlife Plants and Soil Invertebrates
ECOLOGICALLY RELEVANT ENDPOINT (ERE)	Studies reporting a result for endpoints considered as ecologically relevant but is not used for deriving Eco-SSLs (e.g., behavior, mortality).	Plants and Soil Invertebrates
CONTAMINANT FATE/METABOLISM (Fate)	Studies reporting what happens to the contaminant, rather than what happens to the organism. Studies describing the intermediary metabolism of the contaminant (e.g., radioactive tracer studies) without description of adverse effects.	Wildlife Plants and Soil Invertebrates
FOREIGN LANGUAGE (FL)	Studies in languages other than English.	Wildlife Plants and Soil Invertebrates
FOOD STUDIES (Food)	Food science studies conducted to improve production of food for human consumption.	Wildlife
FUNGUS (Fungus)	Studies on fungus.	Wildlife Plants and Soil Invertebrates
GENE (Gene)	Studies of genotoxicity (chromosomal aberrations and mutagenicity).	Wildlife Plants and Soil Invertebrates
HUMAN HEALTH (HHE)	Studies with human subjects.	Wildlife Plants and Soil Invertebrates
IMMUNOLOGY (IMM)	Studies on the effects of contaminants on immunological endpoints.	Wildlife Plants and Soil Invertebrates
INVERTEBRATE (Invert)	Studies that investigate the effects of contaminants on terrestrial invertebrates are excluded.	Wildlife
IN VITRO (In Vit)	*In vitro* studies, including exposure of cell cultures, excised tissues and/or excised organs.	Wildlife Plants and Soil Invertebrates
LEAD SHOT (Lead shot)	Studies administering lead shot as the exposure form. These studies are labeled separately for possible later retrieval and review.	Wildlife
MEDIA (Media)	Authors must report that the study was conducted using natural or artificial soil. Studies conducted in pore water or any other aqueous phase (e.g., hydroponic solution), filter paper, petri dishes, manure, organic or histosoils (e.g., peat muck, humus), are not considered suitable for use in defining soil screening levels.	Plants and Soil Invertebrates
METHODS (Meth)	Studies reporting methods or methods development without usable toxicity test results for specific endpoints.	Wildlife Plants and Soil Invertebrates
MINERAL REQUIREMENTS (Mineral)	Studies examining the minerals required for better production of animals for human consumption, unless there is potential for adverse effects.	Wildlife
MIXTURE (Mix)	Studies that report data for combinations of single toxicants (e.g. cadmium and copper) are excluded. Exposure in a field setting from contaminated natural soils or waste application to soil may be coded as Field Survey.	Wildlife Plants and Soil Invertebrates

Literature Rejection Categories		
Rejection Criteria	**Description**	**Receptor**
MODELING (Model)	Studies reporting the use of existing data for modeling, i.e., no new organism toxicity data are reported. Studies which extrapolate effects based on known relationships between parameters and adverse effects.	Wildlife Plants and Soil Invertebrates
NO CONTAMINANT OF CONCERN (No COC)	Studies that do not examine the toxicity of Eco-SSL contaminants of concern.	Wildlife Plants and Soil Invertebrates
NO CONTROL (No Control)	Studies which lack a control or which have a control that is classified as invalid for derivation of TRVs.	Wildlife Plants and Soil Invertebrates
NO DATA (No Data)	Studies for which results are stated in text but no data is provided. Also refers to studies with insufficient data where results are reported for only one organism per exposure concentration or dose (wildlife).	Wildlife Plants and Soil Invertebrates
NO DOSE or CONC (No Dose)	Studies with no usable dose or concentration reported, or an insufficient number of doses/concentrations are used based on Eco-SSL SOPs. These are usually identified after examination of full paper. This includes studies which examine effects after exposure to contaminant ceases. This also includes studies where offspring are exposed in utero and/or lactation by doses to parents and then after weaning to similar concentrations as their parents. Dose cannot be determined.	Wildlife Plants and Soil Invertebrates
NO DURATION (No Dur)	Studies with no exposure duration. These are usually identified after examination of full paper.	Wildlife Plants and Soil Invertebrates
NO EFFECT (No Efct)	Studies with no relevant effect evaluated in a biological test species or data not reported for effect discussed.	Wildlife Plants and Soil Invertebrates
NO ORAL (No Oral)	Studies using non-oral routes of contaminant administration including intraperitoneal injection, other injection, inhalation, and dermal exposures.	Wildlife
NO ORGANISM (No Org) or NO SPECIES	Studies that do not examine or test a viable organism (also see in vitro rejection category).	Wildlife Plants and Soil Invertebrates
NOT AVAILABLE (Not Avail)	Papers that could not be located. Citation from electronic searches may be incorrect or the source is not readily available.	Wildlife Plants and Soil Invertebrates
NOT PRIMARY (Not Prim)	Papers that are not the original compilation and/or publication of the experimental data.	Wildlife Plants and Soil Invertebrates
NO TOXICANT (No Tox)	No toxicant used. Publications often report responses to changes in water or soil chemistry variables, e.g., pH or temperature. Such publications are not included.	Wildlife Plants and Soil Invertebrates
NO TOX DATA (No Tox Data)	Studies where toxicant used but no results reported that had a negative impact (plants and soil invertebrates).	Plants and Soil Invertebrates
NUTRIENT (Nutrient)	Nutrition studies reporting no concentration related negative impact.	Plants and Soil Invertebrates
NUTRIENT DEFICIENCY (Nut def)	Studies of the effects of nutrient deficiencies. Nutritional deficient diet is identified by the author. If reviewer is uncertain then the administrator should be consulted. Effects associated with added nutrients are coded.	Wildlife
NUTRITION (Nut)	Studies examining the best or minimum level of a chemical in the diet for improvement of health or maintenance of animals in captivity.	Wildlife
OTHER AMBIENT CONDITIONS (OAC)	Studies which examine other ambient conditions: pH, salinity, DO, UV, radiation, etc.	Wildlife Plants and Soil Invertebrates

Literature Rejection Categories		
Rejection Criteria	**Description**	**Receptor**
OIL (Oil)	Studies which examine the effects of oil and petroleum products.	Wildlife Plants and Soil Invertebrates
OM, pH (OM, pH)	Organic matter content of the test soil must be reported by the authors, but may be presented in one of the following ways; total organic carbon (TOC), particulate organic carbon (POC), organic carbon (OC), coarse particulate organic matter (CPOM), particulate organic matter (POM), ash free dry weight of soil, ash free dry mass of soil, percent organic matter, percent peat, loss on ignition (LOI), organic matter content (OMC). With the exception of studies on non-ionizing substances, the study must report the pH of the soil, and the soil pH should be within the range of $4 and #8.5. Studies that do not report pH or report pH outside this range are rejected.	Plants and Soil Invertebrates
ORGANIC METAL (Org Met)	Studies which examine the effects of organic metals. This includes tetraethyl lead, triethyl lead, chromium picolinate, phenylarsonic acid, roxarsone, 3-nitro-4-phenylarsonic acid,, zinc phosphide, monomethylarsonic acid (MMA), dimethylarsinic acid (DMA), trimethylarsine oxide (TMAO), or arsenobetaine (AsBe) and other organo metallic fungicides. Metal acetates and methionines are not rejected and are evaluated.	Wildlife
LEAD BEHAVIOR OR HIGH DOSE MODELS (Pb Behav)	There are a high number of studies in the literature that expose rats or mice to high concentrations of lead in drinking water (0.1, 1 to 2% solutions) and then observe behavior in offspring, and/or pathology changes in the brain of the exposed dam and/or the progeny. Only a representative subset of these studies were coded. Behavior studies examining complex behavior (learned tasks) were also not coded.	Wildlife
PHYSIOLOGY STUDIES (Phys)	Physiology studies where adverse effects are not associated with exposure to contaminants of concern.	Wildlife
PLANT (Plant)	Studies of terrestrial plants are excluded.	Wildlife
PRIMATE (Prim)	Primate studies are excluded.	Wildlife
PUBL AS (Publ as)	The author states that the information in this report has been published in another source. Data are recorded from only one source. The secondary citation is noted as Publ As.	Wildlife Plants and Soil Invertebrates
QSAR (QSAR)	Derivation of Quantitative Structure-Activity Relationships (QSAR) is a form of modeling. QSAR publications are rejected if raw toxicity data are not reported or if the toxicity data are published elsewhere as original data.	Wildlife Plants and Soil Invertebrates
REGULATIONS (Reg)	Regulations and related publications that are not a primary source of data.	Wildlife Plants and Soil Invertebrates
REVIEW (Rev)	Studies in which the data reported in the article are not primary data from research conducted by the author. The publication is a compilation of data published elsewhere. These publications are reviewed manually to identify other relevant literature.	Wildlife Plants and Soil Invertebrates

Literature Rejection Categories		
Rejection Criteria	**Description**	**Receptor**
SEDIMENT CONC (Sed)	Studies in which the only exposure concentration/dose reported is for the level of a toxicant in sediment.	Wildlife Plants and Soil Invertebrates
SCORE (Score)	Papers in which all studies had data evaluation scores at or lower then the acceptable cut-off (#10 of 18) for plants and soil invertebrates).	Plants and Soil Invertebrates
SEDIMENT CONC (Sed)	Studies in which the only exposure concentration/dose reported is for the level of a toxicant in sediment.	Wildlife Plants and Soil Invertebrates
SLUDGE	Studies on the effects of ingestion of soils amended with sewage sludge.	Wildlife Plants and Soil Invertebrates
SOIL CONC (Soil)	Studies in which the only exposure concentration/dose reported is for the level of a toxicant in soil.	Wildlife
SPECIES	Studies in which the species of concern was not a terrestrial invertebrate or plant or mammal or bird.	Plants and Soil Invertebrates Wildlife
STRESSOR (QAC)	Studies examining the interaction of a stressor (e.g., radiation, heat, etc.) and the contaminant, where the effect of the contaminant alone cannot be isolated.	Wildlife Plants and Soil Invertebrates
SURVEY (Surv)	Studies reporting the toxicity of a contaminant in the field over a period of time. Often neither a duration nor an exposure concentration is reported.	Wildlife Plants and Soil Invertebrates
REPTILE OR AMPHIBIAN (Herp)	Studies on reptiles and amphibians. These papers flagged for possible later review.	Wildlife Plants and Soil Invertebrates
UNRELATED (Unrel)	Studies that are unrelated to contaminant exposure and response and/or the receptor groups of interest.	Wildlife
WATER QUALITY STUDY (Wqual)	Studies of water quality.	Wildlife Plants and Soil Invertebrates
YEAST (Yeast)	Studies of yeast.	Wildlife Plants and Soil Invertebrates

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Appendix 5-1

Avian Toxicity Data Extracted and Reviewed for Wildlife Toxicity Reference Value (TRV) - Lead

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March 2005

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Appendix 5.1 Avian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
Lead

Ref			Exposure																				Effects					Conversion to mg/kg bw/day				Result		Data Evaluation Score											
Result #	Ref N.		Chemical Form	MW%	Test Species	# of Conc/ Doses	Conc/ Doses	Conc/Dose Units	Wet Weight Reported?	Percent Moisture	Application Frequency	Method of Analyses	Route of Exposure	Exposure Duration	Duration Units	Age	Age Units	Lifestage	Sex	Control Type	Test Location	Effect Type	Effect Measure	Response Site	Study NOAEL	Study LOAEL	Body Weight Reported?	Body Weight in kg	Ingestion Rate Reported?	Ingestion Rate in kg/day or L/day	NOAEL Dose (mg/kg/day)	LOAEL Dose (mg/kg/day)	Data Source	Dose Route	Test Concentrations	Chemical form	Dose Quantification	Endpoint	Dose Range	Statistical Power	Exposure Duration	Test Conditions	Total
Biochemical																																												
1	2860	Scheuhammer, 1987	Lead nitrate	100	Zebra finch (*Poephila guttata*)	7	0/1/5/10/30/50/100	ug/g diet	N		ADL	U	FD	35	d	NR	NR	AD	M	C	Lab	ENZ	ALAD	BL	1.0	5.0	N	0.99	N	0.0578	0.0584	0.292	10	10	5	10	5	1	8	10	6	4	69
2	2608	Edens and Garlich, 1983	Lead acetate	100	Japanese quail (*Coturnix japonica*)	4	0/1/10/100	mg/kg diet	N		ADL	U	FD	5	w	6	w	JV	F	C	Lab	CHM	CALC	BL	1.0	10.0	N	0.155	Y	0.030	0.194	1.94	10	10	5	5	5	1	8	10	10	4	68
3	2608	Edens and Garlich, 1983	Lead acetate	100	Japanese quail (*Coturnix japonica*)	4	0/1/10/100	mg/kg diet	N		ADL	U	FD	5	w	6	d	JV	F	C	Lab	CHM	CALC	BL	1.0	10.0	Y	0.155	Y	0.030	0.194	1.94	10	10	5	5	7	1	8	10	10	4	70
4	2624	Finley et al., 1976	Lead nitrate	100	Mallard (*Anas platyrhynchos*)	4	0/1.76/5.13/21.63	mg/kg diet	Y	10.4	ADL	M	FD	12	w	1	yr	AD	M	C	Lab	ENZ	ALAD	BL	1.76	5.13	Y	1.162	Y	0.119	0.201	0.586	10	10	10	10	7	1	10	10	6	4	78
5	2608	Edens and Garlich, 1983	Lead acetate	100	Chicken (*Gallus domesticus*)	5	0/50/100/200/400	mg/kg diet	N		ADL	U	FD	2	w	NR	NR	AD	F	C	Lab	CHM	CALC	BL	100	200	Y	1.78	Y	0.111	6.24	12.5	10	10	5	5	7	1	10	10	10	4	72
6	2779	Morgan et al., 1975	Lead acetate	100	Japanese quail (*Coturnix japonica*)	5	0/1/10/100/1000	mg/kg diet	N		ADL	U	FD	5	w	6	d	JV	NR	C	Lab	CHM	HMGL	BL	100	1000	Y	0.11	N	0.0138	12.6	126	10	10	5	5	6	1	8	10	10	4	69
7	2779	Morgan et al., 1975	Lead acetate	100	Japanese quail (*Coturnix japonica*)	5	0/10/100/500/1000	mg/kg diet	N		ADL	U	FD	5	w	1	d	JV	NR	C	Lab	CHM	HMGL	BL	100	500	Y	0.09	N	0.0121	13.5	67.4	10	10	5	5	6	1	8	10	10	4	69
8	6463	Stone et al., 1981	Lead acetate	100	Japanese quail (*Coturnix japonica*)	5	0/25/50/100/200	mg/kg diet	N		NR	U	FD	14	d	1	d	JV	B	C	Lab	CHM	HMGL	BL	200		N	0.0444	N	0.0077	34.5		10	10	5	10	5	1	4	10	10	4	69
9	2606	Edens et al., 1976	Lead acetate	100	Japanese quail (*Coturnix japonica*)	5	0/1/10/100/1000	ug/g diet	N		ADL	U	FD	12	w	0	d	JV	F	C	Lab	CHM	CALC	BL		1.0	N	0.159	N	0.0152		0.111	10	10	5	5	5	1	4	10	10	7	67
10	2636	Franson et al., 1983	Lead metallic	100	American kestrel (*Falco sparverius*)	3	0/9.67/54.0	mg/kg diet	Y	56.7	DLY	M	FD	6	mo	1-6	yr	AD	B	C	FieldA	ENZ	ALAD	BL		9.67	Y	0.1505	N	0.0170		2.52	10	10	10	10	6	1	4	10	6	4	71
11	14770	Kendall and Scanlon, 1982	Lead acetate	100	Ringed Turtle Dove (*Streptopelia risoria*)	4	0.0/25.0/50.0/75.0	mg/kg bw/d	N		1 per d	U	GV	7	d	NR	NR	AD	M	V	Lab	ENZ	ALAD	BL		25.0	Y	0.1392	N	0.0161		25.0	10	8	10	5	10	1	4	10	6	4	68
12	11651	Hoffman et al, 1985	Metallic lead powder	100	American kestrel (*Falco sparverius*)	4	0/25/125/625	mg/kg bw/d	Y		DLY	U	GV	10	d	1	d	JV	NR	V	Lab	CHM	HMGL	BL		25.0	N	0.0753	N	0.0108		26.3	10	8	10	10	10	1	4	10	10	4	77
13	2609	Edens and Melvin, 1989	Lead acetate	100	Japanese quail (*Coturnix japonica*)	2	0/500	mg/kg diet	N		ADL	U	FD	7	w	14	w	JV	F	C	Lab	CHM	CALC	PL		500	Y	0.145	Y	0.027		93.1	10	10	5	5	7	1	4	10	10	4	66
Behavior																																												
14	2624	Finley et al., 1976	Lead nitrate	100	Mallard (*Anas platyrhynchos*)	4	0/1.76/5.13/21.63	mg/kg diet	Y	10.4	ADL	M	FD	12	w	1	yr	AD	M	C	Lab	FDB	FCNS	WO	21.6		Y	1.162	Y	0.119	2.47		10	10	10	10	7	4	4	1	6	4	66
15	2608	Edens and Garlich, 1983	Lead acetate	100	Chicken (*Gallus domesticus*)	5	0/50/100/200/400	mg/kg diet	N		ADL	U	FD	10	w	NR	NR	AD	F	C	Lab	FDB	FCNS	WO	50.0	100	Y	1.81	Y	0.118	3.26	6.52	10	10	5	5	7	4	10	10	10	4	75
16	14768	Damron et al, 1969	Lead acetate	100	Chicken (*Gallus domesticus*)	4	0/10/100/1000	mg/kg diet	N		DLY	U	FD	4	w	4	w	JV	NR	C	Lab	FDB	FEFF	WO	100	1000	N	1.042	Y	0.0740	7.10	71.0	10	10	5	5	6	4	8	10	10	4	72
17	2809	Pattec 1984	Metallic lead	100	American kestrel (*Falco sparverius*)	3	0/19.80/104.40	mg/kg diet	N		DLY	M	FD	6	mo	1-6	yr	AD	B	C	FieldA	FDB	FCNS	WO	104		Y	0.1439	N	0.0165	12.0		10	10	10	10	6	4	4	1	10	10	75
18	14768	Damron et al, 1969	Lead acetate	100	Chicken (*Gallus domesticus*)	4	0/100/1000/2000	mg/kg diet	N		DLY	U	FD	4	w	4	w	JV	NR	C	Lab	FDB	FEFF	WO	1000	2000	N	1.042	Y	0.0640	61.4	123	10	10	5	5	6	4	10	10	10	4	74
19	1285	Donaldson and McGowan, 1989	Lead acetate	100	Chicken (*Gallus domesticus*)	5	0/500/1000/1500/2000	mg/kg diet	N		NR	U	FD	20	d	1	d	JV	M	C	Lab	FDB	FEFF	WO	2000		Y	0.378	N	0.0309	163		10	10	5	5	6	4	4	10	10	4	68
20	2517	Bafundo et al.	Lead acetate trihydrate	100	Chicken (*Gallus domesticus*)	4	0/1100/2200/3300	mg/kg diet	N		ADL	U	FD	14	d	8	d	JV	M	C	Lab	BEH	FEFF	WO	2200	3300	N	0.084	N	0.0116	304	456	10	10	5	5	5	4	10	10	10	4	73
21	2608	Edens and Garlich, 1983	Lead acetate	100	Japanese quail (*Coturnix japonica*)	4	0/1/10/100	mg/kg diet	N		ADL	U	FD	5	w	1	d	JV	F	C	Lab	FDB	FCNS	WO	10.0	100	Y	0.155	Y	0.0300	1.94	19.4	10	10	5	5	7	4	8	10	10	4	71
22	2526	Barthalmus et al., 1977	Lead acetate	100	Pigeon (*Columba livia*)	4	0/6.25/12.5/25.0	mg/kg bw/d	N		DLY	U	GV	17	d	NR	NR	AD	M	C	Lab	BEH	NMVM	WO		6.25	Y	0.48	N	0.0361		6.25	10	8	10	5	10	4	4	10	6	4	71
23	2898	Stone and Soares, 1976	Lead acetate	100	Japanese quail (*Coturnix japonica*)	3	0/500/1000	mg/kg diet	N		ADL	U	FD	32	d	NR	NR	AD	F	C	Lab	FDB	FCNS	WO		500	Y	0.103	N	0.0133		64.3	10	10	5	5	6	4	4	10	10	4	68
24	2609	Edens and Melvin, 1989	Lead acetate	100	Japanese quail (*Coturnix japonica*)	2	0/500	mg/kg diet	N		ADL	U	FD	7	w	14	w	JV	F	C	Lab	FDB	FCNS	WO		500	Y	0.145	Y	0.027		93.1	10	10	5	5	7	4	4	10	10	4	69
25	2517	Bafundo et al.	Lead acetate trihydrate	100	Chicken (*Gallus domesticus*)	2	0/3300	mg/kg diet	N		ADL	U	FD	14	d	8	d	JV	M	C	Lab	BEH	FEFF	WO		3300	N	0.084	N	0.0116		456	10	10	5	5	5	4	4	10	10	4	67
Physiology																																												
26	2608	Edens and Garlich, 1983	Lead acetate	100	Chicken (*Gallus domesticus*)	5	0/50/100/200/400	mg/kg diet	N		ADL	U	FD	10	w	NR	NR	AD	F	C	Lab	PHY	SKIR	FE	100	200	Y	1.78	Y	0.111	6.24	12.5	10	10	5	5	7	4	10	10	10	4	75
Pathology																																												
27	2624	Finley et al., 1976	Lead nitrate	100	Mallard (*Anas platyrhynchos*)	4	0/1.76/5.13/21.63	mg/kg diet	Y	10.4	ADL	M	FD	12	w	1	yr	AD	M	C	Lab	GRS	BDWT	WO	21.6		Y	1.162	Y	0.119	2.33		10	10	10	10	7	4	4	1	6	4	66
28	6291	Stone and Fox, 1984	Lead acetate	100	Japanese quail (*Coturnix japonica*)	3	0/5.4/16.2	mg/kg diet	N		ADL	U	FD	14	d	1	d	JV	B	C	Lab	ORW	ORWT	LI	16.2		Y	0.0455	N	0.007786	2.77		10	10	5	5	6	4	4	10	10	4	68
29	2897	Stone et al., 1977	Lead acetate	100	Japanese quail (*Coturnix japonica*)	2	0/25	mg/kg diet	N		ADL	U	FD	2	w	1	d	JV	NR	C	Lab	ORW	SMIX	KI	25.0		Y	0.036	N	0.006685	4.64		10	10	5	5	6	4	4	8	10	4	66
30	2608	Edens and Garlich, 1983	Lead acetate	100	Chicken (*Gallus domesticus*)	5	0/50/100/200/400	mg/kg diet	N		ADL	U	FD	10	w	NR	NR	AD	F	C	Lab	GRS	BDWT	WO	100	200	Y	1.78	Y	0.111	6.24	12.5	10	10	5	5	7	4	10	10	10	4	75
31	2606	Edens et al., 1976	Lead acetate	100	Japanese quail (*Coturnix japonica*)	5	0/1/10/100/1000	ug/g diet	N		ADL	U	FD	12	w	0	d	JV	M	C	Lab	ORW	ORWT	LI	100	1000	Y	0.127	N	0.0153	11.9	119	10	10	5	5	6	4	8	10	10	7	75
32	2809	Pattec 1984	Metallic lead	100	American kestrel (*Falco sparverius*)	3	0/19.80/104.40	mg/kg diet	N		DLY	M	FD	6	mo	1-6	yr	AD	B	C	FieldA	GRS	BDWT	WO	104		Y	0.1439	N	0.0165	12.0		10	10	10	10	6	4	4	10	10	10	84
33	2526	Barthalmus et al., 1977	Lead acetate	100	Pigeon (*Columba livia*)	4	0/6.25/12.5/25.0	mg/kg bw/d	N		DLY	U	GV	55	d	NR	NR	AD	M	C	Lab	GRS	BDWT	WO	12.5	25.0	N	0.48	N	0.0361	12.5	25.0	10	8	10	5	10	4	10	10	6	4	77
34	2636	Franson et al., 1983	Lead metallic	100	American kestrel (*Falco sparverius*)	3	0/9.67/54.0	mg/kg diet	Y	56.7	DLY	M	FD	6	mo	1-6	yr	AD	B	C	FieldA	ORW	SMIX	MT	54.0		Y	0.1505	N	0.0170	14.1		10	10	10	10	6	4	4	6	6	4	70
35	2576	Cory-Slechta et al., 1980	Lead acetate	100	Pigeon (*Columba livia*)	4	0/18/53/107	mg/kg bw/d	N		1 per d	U	GV	35	d	NR	NR	NR	M	C	Lab	ITX	GITX	WO	18.0	53.0	Y	0.676	N	0.045104	18.0	53.0	10	8	10	5	10	4	10	10	6	4	77
36	2696	Hoffman et al., 1985	Lead powder	100	American kestrel (Falco sparverius)	4	0/25/125/625	mg/kg bw	N		DLY	U	GV	10	d	1	d	JV	NR	V	FieldA	ORW	ORWT	BR	25.0	125	Y	0.0753	N	0.0108	25.0	125	10	8	10	10	10	4	8	10	10	4	84
37	2779	Morgan et al., 1975	Lead acetate	100	Japanese quail (*Coturnix japonica*)	5	0/10/100/500/1000	mg/kg diet	N		ADL	U	FD	5	w	1	d	JV	M	C	Lab	ORW	SMIX	AR	500	1000	Y	0.09	N	0.0121	67.4	135	10	10	5	5	6	4	10	10	10	4	74
38	14770	Kendall and Scanlon, 1982	Lead acetate	100	Ringed Turtle Dove (*Streptopelia risoria*)	4	0.0/25.0/50.0/75.0	mg/kg bw/d	N		1 per d	U	GV	7	d	NR	NR	AD	M	V	Lab	GRS	BDWT	WO	75.0		Y	0.1253	N	0.0151	75.0		10	8	10	5	10	4	4	8	6	4	69
39	2609	Edens and Melvin, 1989	Lead acetate	100	Japanese quail (*Coturnix japonica*)	2	0/500	mg/kg diet	N		ADL	U	FD	7	w	14	w	JV	F	C	Lab	ORW	SMIX	FM	500		Y	0.145	Y	0.027	93.1		10	10	5	5	7	4	4	8	10	4	67
40	2605	Edens, 1985	Lead acetate	100	Japanese quail (*Coturnix japonica*)	5	0/1/10/100/1000	mg/kg diet	N		NR	U	FD	12	w	1	w	JV	F	C	NR	ORW	SMIX	BR	1000		Y	0.131	N	0.015498	118		10	10	5	5	6	4	4	10	10	4	68
41	14384	Vengris and Mare, 1974	Lead acetate	100	Chicken (*Gallus domesticus*)	7	0/20/40/80/160/320/640	mg/kg bw	N		DLY	U	GV	35	d	6	w	JV	B	C	Lab	ITX	ANR	WO	160	320	N	0.0016	N	0.00088	160	320	10	8	10	5	10	4	10	10	10	4	81
42	818	Rao et al., 1989	Lead acetate	54.61	Duck (*Anas platyrhynchos*)	2	0/80	mg/kg diet	N		ADL	U	FD	12	w	7	mo	JV	F	C	Lab	HIS	GLBM	KI		80.0	N	3.12	N	0.122		1.71	10	10	5	5	5	4	4	10	10	4	67
43	817	Rao et al. 1989	Lead acetate	54.61	Duck (*Anas platyrhynchos*)	2	0/80	mg/kg diet	N		NR	U	FD	13	w	7	mo	JV	F	C	NR	HIS	GHIS	KI		80.0	N	1.1	N	0.0619		2.46	10	10	5	5	5	4	4	10	10	4	67
44	2513	Anders et al., 1982	Lead acetate	100	Pigeon (*Columba livia*)	2	0/6.25	mg/kg bw/d	N		DLY	U	GV	5	w	NR	NR	AD	M	C	Lab	HIS	GHIS	KI		6.25	Y	0.605	N	0.0420		6.25	10	8	10	5	10	4	4	10	3	4	68
45	1285	Donaldson and McGowan, 1989	Lead acetate	100	Chicken (*Gallus domesticus*)	5	0/500/1000/1500/2000	mg/kg diet	N		NR	U	FD	20	d	1	d	JV	M	C	Lab	ORW	ORWT	LI		500	N	0.46	N	0.0351		38.2	10	10	5	5	5	4	4	10	10	4	67
46	2898	Stone and Soares, 1976	Lead acetate	100	Japanese quail (*Coturnix japonica*)	3	0/500/1000	mg/kg diet	N		ADL	U	FD	32	d	NR	NR	AD	F	C	Lab	ORW	SMIX	LI		500	Y	0.103	N	0.0133		64.3	10	10	5	5	6	4	4	10	10	4	68
47	2579	Cupo and Donaldson, 1987	Lead acetate	100	Chicken (*Gallus domesticus*)	2	0/2000	mg/kg diet	N		ADL	U	FD	21	d	1	d	JV	M	C	Lab	ORW	ORWT	AR		2000	Y	0.233	N	0.0225		194	10	10	5	5	6	4	4	10	10	4	68
48	2724	Johnsen and Damron 1982	Lead acetate	100	Goose (*Anser cygnides*)	5	0/500/1000/1500/2000	mg/kg diet	N		ADL	U	FD	12	w	26	w	JV	NR	C	FieldA	HIS	GHIS	LI		2000	N	2.27	Y	0.222		196	10	10	5	5	6	4	4	10	10	4	68
49	2898	Stone and Soares, 1976	Lead acetate	100	Japanese quail (*Coturnix japonica*)	2	0/3000	mg/kg diet	N		ADL	U	FD	27	d	NR	NR	AD	F	C	Lab	ORW	SMIX	TB		3000	Y	0.11	N	0.0138		377	10	10	5	5	6	4	4	10	10	4	68
Reproduction																																												
50	2608	Edens and Garlich, 1983	Lead acetate	100	Japanese quail (*Coturnix japonica*)	4	0/1/10/100	mg/kg diet	N		ADL	U	FD	5	w	6	w	LB	F	C	Lab	REP	PROG	WO	1.0	10.0	N	0.155	Y	0.030	0.194	1.94	10	10	5	5	5	10	8	10	10	4	77

Appendix 5.1 Avian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
Lead

Ref			Exposure																			Effects					Conversion to mg/kg bw/day				Result		Data Evaluation Score											
Result #	Ref N.		Chemical Form	MW%	Test Species	# of Conc/ Doses	Conc/ Doses	Conc/Dose Units	Wet Weight Reported?	Percent Moisture	Application Frequency	Method of Analyses	Route of Exposure	Exposure Duration	Duration Units	Age	Age Units	Lifestage	Sex	Control Type	Test Location	Effect Type	Effect Measure	Response Site	Study NOAEL	Study LOAEL	Body Weight Reported?	Body Weight in kg	Ingestion Rate Reported?	Ingestion Rate in kg/day or L/day	NOAEL Dose (mg/kg/day)	LOAEL Dose (mg/kg/day)	Data Source	Dose Route	Test Concentrations	Chemical form	Dose Quantification	Endpoint	Dose Range	Statistical Power	Exposure Duration	Test Conditions	Total
51	2608	Edens and Garlich, 1983	Lead acetate	100	Chicken (*Gallus domesticus*)	3	0/25/50	mg/kg diet	N		ADL	U	FD	4	w	NR	NR	LB	F	C	Lab	REP	PROG	WO	25.0	50.0	N	1.81	Y	0.118	1.63	3.26	10	10	5	5	5	10	10	10	10	4	79
52	2771	Meluzzi et al., 1996	Lead oxide	100	Chicken (*Gallus domesticus*)	4	0/20/30/100	mg/kg diet	N		NR	U	FD	30	d	22	w	LB	F	C	Lab	EGG	ALWT	EG	20.0	30.0	N	1.042	Y	0.1403	2.69	4.04	10	10	5	10	6	10	10	10	6	4	81
53	2668	Haegele et al. 1974	Lead mixture	100	Mallard (*Anas platyrhynchos*)	2	0/100	mg/kg diet	N		ADL	U	FD	76	d	NR	NR	AD	F	C	FieldA	EGG	ESTH	EG	100		N	1.1	N	0.0619	5.63		10	10	5	10	5	10	4	10	3	4	71
54	2809	Pattec 1984	Metallic lead	100	American kestrel (*Falco sparverius*)	3	0/19.80/104.40	mg/kg diet	N		DLY	M	FD	6	mo	1-6	yr	AD	F	C	FieldA	REP	RSUC	WO	104		Y	0.1439	N	0.0165	12.0		10	10	10	10	6	10	4	10	10	10	90
55	2779	Morgan et al., 1975	Lead acetate	100	Japanese quail (*Coturnix japonica*)	5	0/1/10/100/1000	mg/kg diet	N		ADL	U	FD	5	w	6	d	JV	M	C	Lab	REP	TEWT	TE	100	1000	Y	0.11	N	0.0138	12.6	126	10	10	5	5	6	10	8	10	10	4	78
56	2779	Morgan et al., 1975	Lead acetate	100	Japanese quail (*Coturnix japonica*)	5	0/10/100/500/1000	mg/kg diet	N		ADL	U	FD	5	w	1	d	JV	M	C	Lab	REP	TEWT	TE	500	1000	Y	0.09	N	0.0121	67.4	135	10	10	5	5	6	10	10	10	10	4	80
57	2898	Stone and Soares, 1976	Lead acetate	100	Japanese quail (*Coturnix japonica*)	3	0/500/1000	mg/kg diet	N		ADL	U	FD	32	d	NR	NR	AD	F	C	Lab	REP	PROG	WO	1000		Y	0.113	N	0.0141	125		10	10	5	5	6	10	4	3	10	4	67
58	2606	Edens et al., 1976	Lead acetate	100	Japanese quail (*Coturnix japonica*)	5	0/1/10/100/1000	ug/g diet	N		ADL	U	FD	12	w	0	d	LB	B	C	Lab	REP	EGPN	EG		1.0	Y	0.159	N	0.0175		0.111	10	10	5	5	6	10	4	10	10	7	77
59	2608	Edens and Garlich, 1983	Lead acetate	100	Japanese quail (*Coturnix japonica*)	4	0/1/10/100	mg/kg diet	N		ADL	U	FD	12	w	NR	NR	LB	F	C	Lab	REP	PROG	WO		1.0	Y	0.155	Y	0.030		0.194	10	10	5	5	7	10	4	10	10	4	75
60	2608	Edens and Garlich, 1983	Lead acetate	100	Chicken (*Gallus domesticus*)	5	0/50/100/200/400	mg/kg diet	N		ADL	U	FD	10	w	NR	NR	LB	F	C	Lab	REP	PROG	WO		50.0	Y	1.81	Y	0.118		3.26	10	10	5	5	7	10	4	10	10	4	75
61	2734	Kendall and Scanlon, 1981	Lead acetate	100	Ringed Turtle Dove (*Streptopelia risoria*)	2	0/100	mg/L	N		ADL	U	DR	11	w	NR	NR	AD	M	C	Lab	REP	TEWT	TE		100	N	0.123	N	0.014491		11.8	10	5	5	5	5	10	4	10	10	4	68
62	2609	Edens and Melvin, 1989	Lead acetate	100	Japanese quail (*Coturnix japonica*)	2	0/500	mg/kg diet	N		ADL	U	FD	1	w	14	w	JV	F	C	Lab	REP	TPRD	WO		500	Y	0.145	Y	0.027		93.1	10	10	5	5	7	10	4	10	10	4	75
63	2898	Stone and Soares, 1976	Lead acetate	100	Japanese quail (*Coturnix japonica*)	2	0/3000	mg/kg diet	N		ADL	U	FD	27	d	NR	NR	AD	F	C	Lab	REP	PROG	WO		3000	Y	0.11	N	0.0138		377	10	10	5	5	6	10	4	10	10	4	74
Growth																																												
64	2608	Edens and Garlich, 1983	Lead acetate	100	Japanese quail (*Coturnix japonica*)	4	0/1/10/100	mg/kg diet	N		ADL	U	FD	5	w	1	d	JV	F	C	Lab	GRO	BDWT	WO	10.0	100	Y	0.147	Y	0.0230	1.56	15.6	10	10	5	5	7	8	8	10	10	4	77
65	6291	Stone and Fox, 1984	Lead acetate	100	Japanese quail (*Coturnix japonica*)	3	0/5.4/16.2	mg/kg diet	N		ADL	U	FD	2	w	1	d	JV	B	C	Lab	GRO	BDWT	WO	16.2		Y	0.0455	N	0.007786	2.77		10	10	5	5	6	8	4	10	10	4	72
66	2897	Stone et al., 1977	Lead acetate	100	Japanese quail (*Coturnix japonica*)	2	0/25	mg/kg diet	N		ADL	U	FD	2	w	1	d	JV	NR	C	Lab	GRO	BDWT	WO	25.0		Y	0.036	N	0.006685	4.64		10	10	5	5	6	8	4	8	10	4	70
67	2609	Edens and Melvin, 1989	Lead acetate	100	Japanese quail (*Coturnix japonica*)	3	0/50/500	mg/kg diet	N		ADL	U	FD	4	w	0	d	JV	F	C	Lab	GRO	BDWT	WO	50.0	500	Y	0.13	N	0.0154	5.93	59.3	10	10	5	5	6	8	8	10	10	4	76
68	14768	Damron et al, 1969	Lead acetate	100	Chicken (*Gallus domesticus*)	4	0/100/1000/2000	mg/kg diet	N		DLY	U	FD	4	w	4	w	JV	NR	C	Lab	GRO	BDWT	WO	100	1000	N	1.042	Y	0.0640	6.1	61.4	10	10	5	5	6	8	8	10	10	4	76
69	14768	Damron et al, 1969	Lead acetate	100	Chicken (*Gallus domesticus*)	4	0/10/100/1000	mg/kg diet	N		DLY	U	FD	4	w	4	w	JV	NR	C	Lab	GRO	BDWT	WO	100	1000	N	1.042	Y	0.0740	7.1	71.0	10	10	5	5	6	8	8	10	10	4	76
70	2606	Edens et al., 1976	Lead acetate	100	Japanese quail (*Coturnix japonica*)	5	0/1/10/100/1000	ug/g diet	N		ADL	U	FD	12	w	0	d	JV	F	C	Lab	GRO	BDWT	WO	100	1000	Y	0.157	N	0.0174	11.1	111	10	10	5	5	6	8	8	10	10	7	79
71	2605	Edens, 1985	Lead acetate	100	Japanese quail (*Coturnix japonica*)	5	0/1/10/100/1000	mg/kg diet	N		NR	U	FD	12	w	1	w	JV	F	C	NR	GRO	BDWT	WO	100	1000	Y	0.154	N	0.0172	11.2	112	10	10	5	5	6	8	8	10	10	4	76
72	2779	Morgan et al., 1975	Lead acetate	100	Japanese quail (*Coturnix japonica*)	5	0/1/10/100/1000	mg/kg diet	N		ADL	U	FD	2	w	6	d	JV	NR	C	Lab	GRO	BDWT	WO	100	1000	Y	0.11	N	0.0138	12.6	126	10	10	5	5	6	8	8	10	10	4	76
73	2779	Morgan et al., 1975	Lead acetate	100	Japanese quail (*Coturnix japonica*)	5	0/10/100/500/1000	mg/kg diet	N		ADL	U	FD	1	w	1	d	JV	NR	C	Lab	GRO	BDWT	WO	100	500	Y	0.09	N	0.0121	13.5	67.4	10	10	5	5	6	8	8	10	10	4	76
74	1387	Howell and Hill, 1978	Lead dichloride	100	Chicken (*Gallus domesticus*)	2	0/200	mg/kg diet	N		ADL	U	FD	21	d	1	d	JV	B	C	Lab	GRO	BDWT	WO	200		N	0.564	N	0.0401	14.2		10	10	5	10	5	8	4	1	10	4	67
75	2718	Jeng et. al, 1979	Lead nitrate	100	Duck (*Anas platyrhynchos*)	3	0/10/20	mg/kg bw/d	N		DLY	U	GV	3	mo	24	w	MA	F	C	Lab	GRO	BDWT	WO	20.0		Y	1.4	N	0.0725	20.0		10	8	10	10	10	8	4	10	10	7	87
76	2696	Hoffman et al., 1985	Lead powder	100	American kestrel (*Falco sparverius*)	4	0/25/125/625	mg/kg bw	N		DLY	U	GV	10	d	1	d	JV	NR	V	FieldA	GRO	BDWT	WO	25.0	125	Y	0.0753	N	0.0108	25.0	125	10	8	10	10	10	8	8	10	10	4	88
77	1387	Howell and Hill, 1978	Lead dichloride	100	Chicken (*Gallus domesticus*)	2	0/400	mg/kg diet	N		ADL	U	FD	20	d	1	d	JV	B	C	Lab	GRO	BDWT	WO	400		N	0.564	N	0.0401	28.4		10	10	5	10	5	8	4	1	10	4	67
78	6463	Stone et al., 1981	Lead acetate	100	Japanese quail (*Coturnix japonica*)	5	0/25/50/100/200	mg/kg diet	N		NR	U	FD	14	d	1	d	JV	B	C	Lab	GRO	BDWT	WO	200		Y	0.0444	N	0.007662	34.5		10	10	5	10	6	8	4	10	10	4	77
79	2581	Custer et al., 1984	Lead acetate	100	American kestrel (*Falco sparverius*)	4	0/119.7/212.05/448.3	mg/kg diet	N	68.2	7 per w	M	FD	60	d	1-2	yr	AD	B	C	Lab	GRO	BDWT	WO	448		Y	0.1224	N	0.0148	54.3		10	10	10	5	6	8	4	1	10	4	68
80	2534	Berg et al., 1980	Lead carbonate	100	Chicken (*Gallus domesticus*)	5	0/500/1000/1500/2000	mg/kg diet	N		ADL	U	FD	2	w	1	d	JV	M	C	Lab	GRO	BDWT	WO	500	1000	Y	0.118	N	0.0145	61.3	123	10	10	5	10	6	8	10	10	10	4	83
81	2638	Frederick, 1976	Lead nitrate	100	Mallard (*Anas platyrhynchos*)	4	0/5/50/500	mg/kg diet	N		ADL	U	FD	8	d	9	d	JV	NR	V	FieldA	GRO	BDWT	WO	500		N	0.092	N	0.0123	66.9		10	10	5	10	5	8	4	1	10	4	67
82	1285	Donaldson and McGowan, 1989	Lead acetate	100	Chicken (*Gallus domesticus*)	5	0/500/1000/1500/2000	mg/kg diet	N		NR	U	FD	20	d	1	d	JV	M	C	Lab	GRO	BDWT	WO		500	Y	0.46	N	0.0351		38.2	10	10	5	5	6	8	4	10	10	4	72
83	2744	Latta and Donaldson, 1986	Lead acetate	100	Chicken (*Gallus domesticus*)	2	0/1000	mg/kg diet	N		ADL	U	FD	3	w	1	d	JV	M	C	Lab	GRO	BDWT	WO		1000	N	1.3	N	0.0690		53.1	10	10	5	5	5	8	4	10	10	4	71
84	2898	Stone and Soares, 1976	Lead acetate	100	Japanese quail (*Coturnix japonica*)	3	0/500/1000	mg/kg diet	N		ADL	U	FD	32	d	NR	NR	AD	F	C	Lab	GRO	BDWT	WO		500	Y	0.103	N	0.0133		64.3	10	10	5	5	6	8	4	10	10	4	72
85	2748	Leeming and Donaldson, 1984	Lead acetate	100	Chicken (*Gallus domesticus*)	2	0/1000	mg/kg diet	N		ADL	U	FD	19	d	1	d	JV	M	C	Lab	GRO	BDWT	WO		1000	N	0.46	N	0.0351		76.3	10	10	5	5	5	8	4	10	10	4	71
86	2534	Berg et al., 1980	Lead carbonate	100	Chicken (*Gallus domesticus*)	3	0/1000/2000	mg/kg diet	N		ADL	U	FD	2	w	1	d	JV	M	C	Lab	GRO	BDWT	WO		1000	Y	0.114	N	0.0142		124	10	10	5	10	6	8	4	10	10	4	77
87	2517	Bafundo et al.	Lead acetate trihydrate	100	Chicken (*Gallus domesticus*)	4	0/1100/2200/3300	mg/kg diet	N		ADL	U	FD	14	d	8	d	JV	M	C	Lab	GRO	BDWT	WO		1100	N	0.084	N	0.0116		152	10	10	5	5	5	8	4	10	10	4	71
88	2600	Donaldson, 1986	Lead acetate	100	Chicken (*Gallus domesticus*)	2	0/2000	mg/kg diet	N		NR	U	FD	20	d	1	d	JV	M	C	Lab	GRO	BDWT	WO		2000	Y	0.384	N	0.0312		163	10	10	5	5	6	8	4	10	10	4	72
89	5507	Khan, et al, 1993	Lead acetate	100	Chicken (*Gallus domesticus*)	2	0/200	mg/kg bw/d	N		EOD	U	OR	4	w	NR	NR	JV	B	C	Lab	GRO	BDWT	WO		200	Y	1.865	N	0.0873		200	10	8	5	5	10	8	4	10	10	4	74
90	2579	Cupo and Donaldson, 1987	Lead acetate	100	Chicken (*Gallus domesticus*)	2	0/2000	mg/kg diet	N		ADL	U	FD	7	d	1	d	JV	M	C	Lab	GRO	BDWT	WO		2000	Y	0.098	N	0.0128		262	10	10	5	5	6	8	4	10	10	4	72
91	2534	Berg et al., 1980	Lead carbonate	100	Chicken (*Gallus domesticus*)	2	0/2000	mg/kg diet	N		ADL	U	FD	2	w	1	d	JV	M	C	Lab	GRO	BDWT	WO		2000	Y	0.09	N	0.0121		270	10	10	5	10	6	8	4	10	10	4	77
92	2635	Franson and Custer, 1982	Lead acetate	100	Chicken (*Gallus domesticus*)	2	0/1850	mg/kg diet	N		ADL	U	FD	7	d	1	d	IM	NR	C	Lab	GRO	BDWT	WO		1850	Y	0.0692	N	0.0102		273	10	10	5	5	6	8	4	10	10	4	72
93	2517	Bafundo et al.	Lead acetate trihydrate	100	Chicken (*Gallus domesticus*)	2	0/3300	mg/kg diet	N		ADL	U	FD	14	d	8	d	JV	M	C	Lab	GRO	BDWT	WO		3300	N	0.084	N	0.0116		282	10	10	5	5	5	8	4	10	10	4	71
Survival																																												
94	2624	Finley et al., 1976	Lead nitrate	100	Mallard (*Anas platyrhynchos*)	4	0/1.76/5.13/21.63	mg/kg diet	Y	10.4	ADL	M	FD	12	w	1	yr	AD	M	C	Lab	MOR	MORT	WO	21.6		Y	1.162	Y	0.119	2.47		10	10	10	10	7	9	4	10	6	4	80
95	2526	Barthalmus et al., 1977	Lead acetate	100	Pigeon (*Columba livia*)	4	0/6.25/12.5/25.0	mg/kg bw/d	N		DLY	U	GV	40	d	NR	NR	AD	M	C	Lab	MOR	MORT	WO	12.5	25.0	N	0.48	N	0.0361	12.5	25.0	10	8	10	5	10	9	10	10	6	4	82
96	1387	Howell and Hill, 1978	Lead dichloride	100	Chicken (*Gallus domesticus*)	2	0/200	mg/kg diet	N		ADL	U	FD	21	d	1	d	JV	B	C	Lab	MOR	MORT	WO	200		N	0.564	N	0.0401	14.2		10	10	5	10	5	9	4	10	10	4	77
97	1387	Howell and Hill, 1978	Lead dichloride	100	Chicken (*Gallus domesticus*)	2	0/400	mg/kg diet	N		ADL	U	FD	20	d	1	d	JV	B	C	Lab	MOR	MORT	WO	400		N	0.564	N	0.0401	28.4		10	10	5	10	5	9	4	10	10	4	77
98	2581	Custer et al., 1984	Lead acetate	100	American kestrel (*Falco sparverius*)	4	0/119.7/212.05/448.3	mg/kg diet	N		6 per w	M	FD	60	d	1-2	yr	AD	B	C	Lab	MOR	MORT	WO	448		Y	0.1224	N	0.0148	54.3		10	10	10	5	6	9	4	10	10	4	78
99	2638	Frederick, 1976	Lead nitrate	100	Mallard (*Anas platyrhynchos*)	4	0/5/50/500	mg/kg diet	N		ADL	U	FD	8	d	9	d	JV	NR	V	FieldA	MOR	MORT	WO	500		N	0.092	N	0.0123	66.9		10	10	5	10	5	9	4	10	10	4	77
100	2696	Hoffman et al., 1985	Lead powder	100	American kestrel (*Falco sparverius*)	4	0/25/125/625	mg/kg bw	N		DLY	U	GV	10	d	1	d	JV	NR	V	FieldA	MOR	SURV	WO	125	625	Y	0.0668	N	0.0100	125	625	10	8	10	10	10	9	8	10	10	4	89
101	14384	Vengris and Mare, 1974	lead acetate	100	Chicken (*Gallus domesticus*)	7	0/20/40/80/160/320/640	mg/kg bw	N		DLY	U	GV	35	d	6	w	JV	B	C	Lab	MOR	MORT	WO	160	320	N	1.6	N	0.0790	160	320	10	8	10	5	10	9	10	10	10	4	86
102	1285	Donaldson and McGowan, 1989	Lead acetate	100	Chicken (*Gallus domesticus*)	5	0/500/1000/1500/2000	mg/kg diet	N		NR	U	FD	20	d	1	d	JV	M	C	Lab	MOR	MORT	WO	2000		Y	0.378	N	0.0309	163		10	10	5	5	6	9	4	3	10	4	66
103	2724	Johnsen and Damron 1982	Lead acetate	100	Goose (Anser cygnides)	5	0/500/1000/1500/2000	mg/kg diet	N		ADL	U	FD	12	w	26	w	JV	NR	C	FieldA	MOR	MORT	WO	2000		N	2.27	Y	0.222	196		10	10	5	5	6	9	4	10	10	4	73

Appendix 5.1 Avian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
Lead
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Ref			Exposure																			Effects					Conversion to mg/kg bw/day				Result		Data Evaluation Score											
Result #	Ref N.		Chemical Form	MW%	Test Species	# of Conc/ Doses	Conc/ Doses	Conc/Dose Units	Wet Weight Reported?	Percent Moisture	Application Frequency	Method of Analyses	Route of Exposure	Exposure Duration	Duration Units	Age	Age Units	Lifestage	Sex	Control Type	Test Location	Effect Type	Effect Measure	Response Site	Study NOAEL	Study LOAEL	Body Weight Reported?	Body Weight in kg	Ingestion Rate Reported?	Ingestion Rate in kg/day or L/day	NOAEL Dose (mg/kg/day)	LOAEL Dose (mg/kg/day)	Data Source	Dose Route	Test Concentrations	Chemical form	Dose Quantification	Endpoint	Dose Range	Statistical Power	Exposure Duration	Test Conditions	Total
104	2513	Anders et al., 1982	Lead acetate	100	Pigeon (*Columba livia*)	2	0/6.25	mg/kg bw/d	N		DLY	U	GV	4	w	NR	NR	AD	M	C	Lab	MOR	MORT	WO		6.25	Y	0.605	N	0.0420		6.3	10	8	10	5	10	9	4	10	3	4	73
105	2579	Cupo and Donaldson, 1987	Lead acetate	100	Chicken (*Gallus domesticus*)	2	0/2000	mg/kg diet	N		ADL	U	FD	21	d	1	d	JV	M	C	Lab	MOR	MORT	WO		2000	Y	0.233	N	0.0225		194	10	10	5	5	6	9	4	10	10	4	73
106	1415	Khan et al, 1993	Lead acetate	100	Chicken (*Gallus domesticus*)	2	0/400	mg/kg bw	N		EOD	U	GV	7	d	43	d	JV	F	C	Lab	MOR	MORT	WO		400	N	1.6	N	0.0790		400	10	8	10	5	10	9	4	10	10	4	80
Data Not Used to Derive Wildlife Toxicity Reference Value																																											
107	14638	Redig et al., 1991	Lead acetate	100	Red-tailed hawk (*Buteo jamaicensis*)	2	0/0.82	mg/kg bw/d	N		DLY	U	GV	24	d	NR	NR	AD	B	C	Lab	ITX	INTX	WO	0.820		N	1	N	na	0.820		10	8	5	5	10	4	4	1	3	4	54
108	3736	Jordan and Bhatnagar, 1990	Lead acetate	54.61	Duck (*Anas platyrhynchos*)	2	0/80	mg/kg diet	N		ADL	U	FD	12	w	7	mo	JV	F	C	Lab	ENZ	GSTR	LI	80.0		N	1.1	N	0.0619	1.71		10	10	5	5	5	1	4	6	10	4	60
109	2764	Mazliah et al., 1989	Lead acetate	54.61	Chicken (*Gallus domesticus*)	2	0/5	mg/kg bw/d	N		DLY	U	GV	25	w	1	d	JV	B	V	Lab	CHM	CALC	EG	5.0		Y	2	N	0.0914	2.73		10	8	10	5	10	1	4	1	3	4	56
110	2764	Mazliah et al., 1989	Lead acetate	54.61	Chicken (*Gallus domesticus*)	2	0/5	mg/kg bw/d	N		DLY	U	GV	25	w	42	w	JV	B	V	Lab	GRO	BDWT	WO	5.0		Y	2	N	0.0914	2.73		10	8	10	5	10	8	4	1	3	4	63
111	2764	Mazliah et al., 1989	Lead acetate	54.61	Chicken (*Gallus domesticus*)	2	0/5	mg/kg bw/d	N		DLY	U	GV	25	w	1	d	JV	F	V	Lab	REP	PROG	WO	5.0		Y	2	N	0.0914	2.73		10	8	10	5	10	10	4	1	3	4	65
112	6291	Stone and Fox, 1984	lead acetate	100	Japanese quail (*Coturnix japonica*)	3	0/5.4/16.2	mg/kg diet	N		ADL	U	FD	14	d	NR	NR	AD	B	C	Lab	CHM	HMGL	BL	16.2		Y	0.0455	N	0.0078	2.77		10	10	5	5	6	1	4	10	10	4	65
113	2608	Edens and Garlich, 1983	Lead acetate	100	Chicken (*Gallus domesticus*)	3	0/25/50	mg/kg diet	N		ADL	U	FD	4	w	NR	NR	NR	F	C	Lab	CHM	CALC	BL	50.0		N	1.81	Y	0.118	3.26		10	10	5	5	5	1	4	8	10	4	62
114	2521	Baksi and Kenny, 1979	Lead acetate	100	Japanese quail (*Coturnix japonica*)	5	0/0.032/0.32/3.2/16.0	mg/ml	N		NR	U	DR	15	d	1	w	JV	F	C	NR	CHM	VTD3	KI	0.032	0.32	Y	0.08	N	0.0109	4.34	43.4	10	5	5	5	6	1	8	10	10	4	64
115	2668	Haegele et al. 1974	Lead mixture	100	Mallard (*Anas platyrhynchos*)	2	0/100	mg/kg diet	N		ADL	U	FD	85	d	NR	NR	SM	F	C	FieldA	ITX	INTX	WO	100		N	1.2	N	0.0655	5.46		10	10	5	10	5	4	4	1	6	4	59
116	2668	Haegele et al. 1974	Lead mixture	100	Mallard (*Anas platyrhynchos*)	2	0/100	mg/kg diet	N		ADL	U	FD	85	d	NR	NR	SM	F	C	FieldA	MOR	MORT	WO	100		N	1.1	N	0.0619	5.63		10	10	5	10	5	9	4	1	3	4	61
117	2771	Meluzzi et al., 1996	Lead oxide	100	Chicken (*Gallus domesticus*)	4	0/20/30/100	mg/kg diet	N		NR	U	FD	75	d	22	w	JV	F	C	Lab	FDB	FCNS	WO	100		N	1.6	Y	0.1403	8.77		10	10	5	10	6	4	4	1	6	4	60
118	2591	Dietz et al., 1979	Lead acetate	100	Pigeon (*Columba livia*)	2	0/6.25	mg/org	N		7 per w	U	GV	6	d	NR	NR	AD	M	V	Lab	MOR	MORT	WO	6.25		Y	0.48	N	0.0361	13.0		10	8	5	5	6	9	4	10	3	4	64
119	25894	Dauwe, et al. 2002	Lead acetate	100	Zebra finch (*Poephila guttata*)	3	0/25/100	mg/L	N		ADL	U	DR	10	d	NR	NR	AD	M	C	Lab	MOR	MORT	WO	25.0	100	N	0.001	N	0.00058	14.4	57.7	10	5	5	5	5	9	8	10	3	4	64
120	2573	ConNr et al., 1994	Lead	100	Nrthern Bobwhites	2	0/360	mg/kg diet	N		ADL	U	FD	21	d	17	w	JV	M	C	Lab	FDB	FCNS	WO	360		N	0.16	Y	0.0110	24.8		10	10	5	4	6	4	4	1	3	4	51
121	2573	ConNr et al., 1994	Lead	100	Nrthern Bobwhites	2	0/360	mg/kg diet	N		ADL	U	FD	21	d	17	w	JV	M	C	Lab	GRO	BDWT	WO	360		N	0.16	Y	0.0110	24.8		10	10	5	4	6	8	4	1	3	4	55
122	2744	Latta and Donaldson, 1986	Lead acetate	100	Chicken (*Gallus domesticus*)	2	0/1000	mg/kg diet	N		ADL	U	FD	3	w	1	d	JV	M	C	Lab	MOR	SURV	WO	1000		N	1.3	N	0.0690	53.1		10	10	5	5	5	9	4	1	10	4	63
123	2638	Frederick, 1976	Lead nitrate	100	Mallard (*Anas platyrhynchos*)	4	0/5/50/500	mg/kg diet	N		ADL	U	FD	8	d	9	d	JV	NR	V	FieldA	BEH	NMVM	WO	500		N	0.092	N	0.0123	66.9		10	10	5	10	5	4	4	1	10	4	63
124	2609	Edens and Melvin, 1989	Lead acetate	100	Japanese quail (*Coturnix japonica*)	2	0/500	mg/kg diet	N		ADL	U	FD	7	w	14	w	JV	F	C	Lab	GRO	BDWT	WO	500		Y	0.145	Y	0.027	93.1		10	10	5	5	7	8	4	1	10	4	64
125	2779	Morgan et al., 1975	Lead acetate	100	Japanese quail (*Coturnix japonica*)	5	0/1/10/100/1000	mg/kg diet	N		ADL	U	FD	5	w	6	d	JV	M	C	Lab	ORW	SMIX	AR	1000		Y	0.11	N	0.0138	126		10	10	5	5	6	4	4	3	10	4	61
126	2724	Johnsen and Damron 1982	Lead acetate	100	Goose (*Anser cygnide* s)	5	0/500/1000/1500/2000	mg/kg diet	N		ADL	U	FD	12	w	26	w	JV	NR	C	FieldA	FDB	FCNS	WO	2000		N	2.27	Y	0.2220	196		10	10	5	5	6	4	4	1	10	4	59
127	2724	Johnsen and Damron 1982	Lead acetate	100	Goose (Anser cygNides)	5	0/500/1000/1500/2000	mg/kg diet	N		ADL	U	FD	12	w	26	w	JV	NR	C	FieldA	GRO	BDWT	WO	2000		N	2.27	Y	0.2220	196		10	10	5	5	6	8	4	1	10	4	63
128	2635	Franson and Custer, 1982	Lead acetate	100	Chicken (*Gallus domesticus*)	2	0/1850	mg/kg diet	N		ADL	U	FD	28	d	1	d	JV	NR	C	Lab	MOR	MORT	WO	1850		Y	0.1614	N	0.0178	203		10	10	5	5	6	9	4	1	10	4	64
129	2898	Stone and Soares, 1976	Lead acetate	100	Japanese quail (*Coturnix japonica*)	2	0/3000	mg/kg diet	N		ADL	U	FD	27	d	NR	NR	AD	F	C	Lab	GRO	BDWT	WO	3000		Y	0.11	N	0.0138	377		10	10	5	5	6	8	4	3	10	4	65
130	14383	Simpson et al, 1970	Lead acetate	100	Chicken (*Gallus domesticus*)	3	0/5000/10000	mg/kg diet	N		DLY	U	FD	3	w	4	w	JV	M	C	Lab	CHM	PCLV	BL	10000		N	1.042	N	0.0598	574		10	10	5	5	5	1	4	1	10	4	55
131	2605	Edens, 1985	Lead acetate	100	Japanese quail (*Coturnix japonica*)	5	0/1/10/100/1000	mg/kg diet	N		NR	U	FD	12	w	1	w	JV	F	C	NR	ENZ	ACHE	BR		1.0	Y	0.157	N	0.0174		0.111	10	10	5	5	6	1	4	10	10	4	65
132	14638	Redig et al., 1991	Lead acetate	100	Red-tailed hawk (*Buteo jamaicensis*)	2	0/0.82	mg/kg bw/d	N		DLY	U	GV	24	d	NR	NR	AD	B	C	Lab	CHM	PORP	BL		0.82	N	1	N	na		0.820	10	8	5	5	10	1	4	10	3	4	60
133	2757	Majumdar et al., 1995	Lead nitrate	62.56	House sparrow (*Passer domesticus*)	2	0/50	ug/org/d	N		6	U	GV	6	d	0	w	SM	B	C	Lab	CHM	Other	IN		50.0	Y	0.025	Y	na		1.25	10	8	5	10	7	1	4	10	3	4	62
134	2897	Stone et al., 1977	Lead acetate	100	Japanese quail (*Coturnix japonica*)	2	0/25	mg/kg diet	N		ADL	U	FD	2	w	1	d	JV	NR	C	Lab	ENZ	ALAD	BL		25.0	Y	0.036	N	0.00668		4.64	10	10	5	5	6	1	4	10	10	4	65
135	2513	Anders et al., 1982	Lead acetate	100	Pigeon (*Columba livia*)	2	0/6.25	mg/kg bw/d	N		DLY	U	GV	2	w	NR	NR	AD	M	C	Lab	CHM	RBCE	BL		6.25	Y	0.605	N	0.0420		6.25	10	8	10	5	10	1	4	10	3	4	65
136	2734	Kendall and Scanlon, 1981	Lead acetate	100	Ringed Turtle Dove (*Streptopelia risoria*)	2	0/100	mg/L	N		ADL	U	DR	1	w	NR	NR	AD	F	C	Lab	GRS	BDWT	WO		100	N	0.123	N	0.0145		11.8	10	5	5	5	4	4	10	10	4	62
137	2591	Dietz et al., 1979	Lead acetate	100	Pigeon (*Columba livia*)	2	0/6.25	mg/org	N		7 per w	U	GV	67	d	NR	NR	AD	M	V	Lab	BEH	ACTP	WO		6.25	Y	0.48	N	0.0361		13.0	10	8	5	5	6	4	4	10	3	4	64
138	2591	Dietz et al., 1979	Lead acetate	100	Pigeon (*Columba livia*)	2	0/6.25	mg/org	N		7 per w	U	GV	56	d	NR	NR	AD	M	V	Lab	HIS	EDMA	CR		6.25	Y	0.48	N	0.0361		13.0	10	8	5	5	6	4	4	10	3	4	64
139	2744	Latta and Donaldson, 1986	Lead acetate	100	Chicken (*Gallus domesticus*)	2	0/1000	mg/kg diet	N		ADL	U	FD	3	w	1	d	JV	M	C	Lab	CHM	NPSH	LI		1000	N	1.3	N	0.0690		53.1	10	10	5	5	5	1	4	10	10	4	64
140	2576	Cory-Slechta et al., 1980	Lead acetate	100	Pigeon (*Columba livia*)	3	0/1000/3000	mg/L	N		DLY	U	DR	15	d	NR	NR	NR	M	C	Lab	GRO	BDWT	WO		1000	Y	0.628	Y	0.0400		63.7	10	5	5	5	7	8	4	10	6	4	64
141	2576	Cory-Slechta et al., 1980	Lead acetate	100	Pigeon (*Columba livia*)	3	0/1000/3000	mg/L	N		DLY	U	DR	61	d	NR	NR	NR	M	C	Lab	ITX	GITX	WO		1000	Y	0.628	Y	0.0400		63.7	10	5	5	5	7	4	4	10	3	4	57
142	2898	Stone and Soares, 1976	Lead acetate	100	Japanese quail (*Coturnix japonica*)	3	0/500/1000	mg/kg diet	N		ADL	U	FD	32	d	NR	NR	AD	F	C	Lab	ENZ	ALAD	BL		500	Y	0.103	N	0.0133		64.3	10	10	5	5	6	1	4	10	10	4	65
143	2748	Leeming and Donaldson, 1984	Lead acetate	100	Chicken (*Gallus domesticus*)	2	0/1000	mg/kg diet	N		ADL	U	FD	19	d	1	d	JV	M	C	Lab	CHM	GLTH	LI		1000	N	0.46	N	0.0351		76.3	10	10	5	5	5	1	4	10	10	4	64
144	429	Donaldson, 1985	Lead acetate	100	Chicken (*Gallus domesticus*)	2	0/1000	mg/kg diet	N		ADL	U	FD	3	w	22	w	JV	M	C	Lab	CHM	NEFA	BL		1000	Y	0.458	N	0.0350		76.4	10	10	5	5	6	1	4	10	10	4	65
145	2600	Donaldson, 1986	Lead acetate	100	Chicken (*Gallus domesticus*)	2	0/2000	mg/kg diet	N		NR	U	FD	20	d	1	d	JV	M	C	Lab	CHM	NPSH	LI		2000	Y	0.384	N	0.0312		163	10	10	5	5	6	1	4	10	10	4	65
146	429	Donaldson, 1985	Lead acetate	100	Chicken (*Gallus domesticus*)	2	0/2000	mg/kg diet	N		ADL	U	FD	3	w	1	d	JV	M	C	Lab	CHM	NEFA	BL		2000	Y	0.297	N	0.0264		178	10	10	5	5	6	1	4	10	10	4	65
147	2579	Cupo and Donaldson, 1987	Lead acetate	100	Chicken (*Gallus domesticus*)	2	0/2000	mg/kg diet	N		ADL	U	FD	21	d	1	d	JV	M	C	Lab	CHM	TRYP	BL		2000	Y	0.233	N	0.0225		194	10	10	5	5	6	1	4	10	10	4	65
148	2635	Franson and Custer, 1982	Lead acetate	100	Chicken (*Gallus domesticus*)	2	0/1850	mg/kg diet	N		ADL	U	FD	7	d	1	d	JV	NR	C	Lab	CHM	HMGL	BL		1850	Y	0.0692	N	0.0102		273	10	10	5	5	6	1	4	10	10	4	65
149	2898	Stone and Soares, 1976	Lead acetate	100	Japanese quail (*Coturnix japonica*)	2	0/3000	mg/kg diet	N		ADL	U	FD	27	d	NR	NR	AD	F	C	Lab	ENZ	ALAD	BL		3000	Y	0.11	N	0.0138		377	10	10	5	5	6	1	4	10	10	4	65

The abbreviations and definitions used in coding data are provided in Attachment 4-3 of the Eco-SSL Guidance (U.S.EPA, 2003).

Appendix 6-1

Mammalian Toxicity Data Extracted and Reviewed for Wildlife Toxicity Reference Value (TRV) - Lead

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March 2005

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Appendix 6.1 Mammalian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
Lead

Ref			Exposure																				Effects					Conversion to mg/kg bw/day				Result		Data Evaluation Score											
Result #	Ref N.		Chemical Form	MW%	Test Species	# of Conc/ Doses	Conc/ Doses	Conc/Dose Units	Wet Weight Reported?	Percent Moisture	Application Frequency	Method of Analyses	Route of Exposure	Exposure Duration	Duration Units	Age	Age Units	Lifestage	Sex	Control Type	Effect Type	Effect Measure	Response Site	Study NOAEL	Study LOAEL	Body Weight Reported?	Body Weight in kg	Ingestion Rate Reported?	Ingestion Rate in kg or L/day	NOAEL Dose (mg/kg/day)	LOAEL Dose (mg/kg/day)	Data Source	Dose Route	Test Concentrations	Chemical form	Dose Quantification	Endpoint	Dose Range	Statistical Power	Exposure Duration	Test Conditions	Total
Biochemical																																												
1	2737	Kimmel et al., 1980	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/0.92/4.7/8.9	mg/kg bw/d	N		ADL	U	DR	10	w	21	d	JV	F	V	ENZ	ALAD	UR	0.920	4.70	Y	0.3	N	0.0335	0.920	4.70	10	5	5	5	10	1	8	10	10	7	71
2	3873	Horwitt and Cowgill, 1937	Lead acetate	100	Dog (*Canis familiaris*)	3	0/27/102	mg/kg diet	N		DLY	M	FD	7	mo	NR	NR	JV	NR	C	CHM	HMGL	BL	27.0	102	Y	12.8	N	0.5586	1.18	4.45	10	10	10	5	6	1	8	10	10	4	74
3	3747	Azar et al., 1973	lead acetate	100	Rat (*Rattus norvegicus*)	5	0/18/62/141/548	mg/kg diet	N		NR	M	FD	2	yr	NR	NR	NR	B	C	ENZ	ALAD	BL	18.0	62.0	N	0.51	N	0.0395	1.39	4.80	10	10	10	5	5	1	8	10	10	4	73
4	3830	Carson et al., 1973	Lead	100	Sheep (*Ovis aries*)	3	0/2.3/4.5	mg/kg bw/d	N		DLY	U	FD	27	w	NR	NR	GE	F	C	CHM	PCLV	BL	2.30	4.5	N	na	Y	0.227	2.30	4.50	10	10	5	4	10	1	10	10	10	4	74
5	3747	Azar et al., 1973	lead acetate	100	Dog (*Canis familiaris*)	5	0/16/57/155/576	mg/kg diet	N		NR	M	FD	2	yr	NR	NR	NR	B	C	ENZ	ALAD	BL	57.0	155	N	14	N	0.60128	2.45	6.66	10	10	10	5	5	1	10	10	10	4	75
6	11831	Jessup and Shott, 1969	Lead acetate	100	Rat (*Rattus norvegicus*)	5	0/10/50/100/1000	mg/kg diet	N		ADL	U	FD	12	mo	70	d	LC	B	C	ENZ	G6PD	BL	50.0	100	Y	0.286	N	0.02455	4.29	8.58	10	10	5	5	6	1	10	10	10	4	71
7	2675	Hammond et al., 1989	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/50/250/500	mg/L	N		ADL	U	DR	23	d	22	d	JV	F	C	CHM	SOMC	BL	50.0	250	N	0.204	N	0.02368	5.80	29.0	10	5	5	5	5	1	8	10	10	7	66
8	2756	Mahaffey et al., 1973	Lead acetate	100	Rat (*Rattus norvegicus*)	7	0/0.19/0.70/2.8/5.9/12.9/24.3	mg/kg bw/d	N		NR	U	DR	10	w	NR	NR	JV	M	C	CHM	HMCT	BL	5.90	12.95	Y	0.337	N	0.0372	5.90	12.9	10	5	5	5	10	1	10	10	10	4	70
9	2666	Gupta et al., 1995	Lead acetate	54.61	Mouse (*Mus musculus*)	4	0/10/25/50	mg/kg bw	N		DLY	U	GV	52	d	2	mo	GE	F	C	ENZ	ALAD	KI	25.0	50.0	Y	0.025	N	0.00331	13.7	27.3	10	8	10	5	10	1	10	10	3	4	71
10	3889	Logner et al., 1984	Lead sulfate	100	Cattle (*Bos taurus*)	4	0/16/43/305	mg/kg bw/d	N		DLY	U	FD	6	w	74	d	JV	M	C	CHM	PCLV	BL	16.0	43.0	Y	129.94	Y	3.64	16.0	43.0	10	10	5	10	10	1	10	10	10	4	80
11	2524	Barratt et al., 1989	Lead acetate	54.61	Rat (*Rattus norvegicus*)	4	0/0.3/33/300	mg/kg bw	N		DLY	U	GV	9	w	10	w	JV	M	C	CHM	PRTL	LI	33.0	330	N	0.217	N	0.01957	18.0	180	10	8	10	5	10	1	8	10	10	4	76
12	3704	Fick et al., 1976	Lead acetate	100	Sheep (*Ovis aries*)	5	0/10/100/500/1000	mg/kg diet	N		DLY	U	FD	84	d	NR	NR	JV	M	C	CHM	HMGL	BL	1000		Y	37	Y	1.21	32.7		10	10	5	5	7	1	4	10	10	4	66
13	2507	Agodi et al., 1990	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/50	mg/kg bw	N		DLY	U	GV	28	d	2	d	JV	B	V	ENZ	SCDH	BR	50.0		Y	0.0531	N	0.00615	50.0		10	8	10	5	10	1	4	8	10	4	70
14	2733	Kempinas et. al 1988	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/0.5/1.0	g/L	N		ADL	U	DR	90	d	NR	NR	AD	M	C	CHM	HMCT	SM	0.500	1.000	Y	0.12	N	0.01469	61.2	122	10	5	5	5	6	1	10	10	10	4	66
15	2923	Vyskocil et al., 1995	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/81.3/320	mg/kg bw/d	N		ADL	U	DR	1	mo	9-10	w	SM	F	C	CHM	GBCM	UR	81.3	320	Y	0.25	N	0.02843	81.3	320	10	5	5	5	10	1	8	10	10	4	68
16	2815	Petrusz et al., 1979	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/25/100/200	mg/kg bw/d	N		DLY	U	GV	18	d	2	d	JV	F	C	HRM	Other	PI	100	200	Y	0.037	N	0.00457	100	200	10	8	10	5	10	1	10	10	10	4	78
17	2680	Harry et al., 1985	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg bw	N		DLY	U	GV	29	d	2	d	JV	B	V	CHM	PRTL	BR	200		Y	0.065	N	0.00726	200		10	8	10	5	10	1	4	10	10	4	72
18	2922	Vyskocil et al., 1989	Lead acetate	54.61	Rat (*Rattus norvegicus*)	4	0/0.5/1/2	% in water	N		ADL	U	DR	1	mo	8	w	JV	M	C	CHM	B2MG	UR	0.500	1.00	Y	0.2	N	0.02326	320	640	10	5	5	5	6	1	10	10	10	4	66
19	2697	Holtzman et al., 1982	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/400/800/1600	mg/kg bw/d	N		DLY	U	GV	14	d	18	d	JV	NR	C	CHM	PCLV	BL	400	800	N	0.267	N	0.0232	400	800	10	8	10	5	10	1	10	10	10	4	78
20	2697	Holtzman et al., 1982	Lead acetate	100	Rat (*Rattus norvegicus*)	5	0/400/800/1600/2400	mg/kg bw/d	N		DLY	U	GV	14	d	14	d	JV	NR	C	CHM	PCLV	BL	800	1600	N	0.267	N	0.0232	800	1600	10	8	10	5	10	1	10	10	10	4	78
21	2697	Holtzman et al., 1982	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/2400/3200	mg/kg bw/d	N		DLY	U	GV	14	d	20	d	JV	NR	C	CHM	PCLV	BL	2400	3200	N	0.267	N	0.0232	2400	3200	10	8	10	5	10	1	10	10	10	4	78
22	14380	Lynch et al, 1975	Lead carbonate	77.55	Cattle (*Bos taurus*)	4	0/0.64/1.28/2.57	mg/kg bw/d	N		3 per w	U	OR	7	w	1	w	JV	M	C	ENZ	ALAD	BL		0.640	Y	67	N	2.17766		0.496	10	8	10	10	10	1	4	10	10	4	77
23	2877	Singh and Ashraf, 1989	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/1.0	mg/kg bw/d	N		6 per w	U	GV	10	w	5	d	JV	B	C	HRM	NORE	BR		1.00	N	0.235	N	0.02089		1.00	10	8	10	5	10	1	4	10	10	4	72
24	2789	Nehru and Kaushal, 1991	Lead acetate	54.61	Rat (*Rattus norvegicus*)	4	0/2.5/5/25	mg/kg bw/d	N		DLY	U	GV	15	d	NR	NR	NR	F	C	ENZ	SCDH	KI		2.50	N	0.4	N	0.03235		1.37	10	8	10	5	10	1	4	10	10	4	72
25	3709	Lassen and Buck, 1979	Lead acetate	100	Pig (*Sus scrofa*)	5	0/3.77/7.54/15.09/30.17	mg/kg bw/d	N		DLY	U	DR	1	w	6	w	JV	NR	C	ENZ	ALAD	BL		3.77	Y	24	N	1.72912		3.77	10	5	10	5	10	1	4	10	10	4	69
26	3711	Lynch et al., 1976	Lead carbonate	100	Cattle (*Bos taurus*)	3	0/4.16/7.79	mg/kg bw/d	N		3 per w	U	OR	42	d	NR	NR	JV	M	C	ENZ	ALAD	BL		4.16	Y	86.7	Y	0.25		4.16	10	8	10	10	10	1	4	10	10	4	77
27	2751	Lorenzo et al., 1978	Lead nitrate	62.56	Rabbit (*Oryctolagus cuniculus*)	5	0/7.2/33.48	mg/kg bw/d	N		DLY	U	GV	30	d	1	d	JV	F	C	CHM	Other	BL		7.20	N	3.1	N	0.17412		7.20	10	8	10	10	5	1	4	10	10	4	72
28	14377	Kelliher, et al. 1973	Lead acetate	100	Cattle (Bos taurus)	2	0.015	g/kg bw/d	N		CON	U	FD	133	d	7	mo	JV	M	C	ENZ	ALAD	BL		0.0150	Y	220	N	5.78666		15.0	10	10	5	5	10	1	4	10	10	4	69
29	2625	Cerklewski and Forbes, 1977	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg diet	N		DLY	U	FD	1	w	21	d	GE	M	C	ENZ	ALAD	UR		200	Y	0.196	Y	0.015		15.3	10	10	5	5	7	1	4	10	10	4	66
30	14580	Mahaffey et al., 1977	lead acetate	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg diet	N		ADL	UX	FD	10	w	NR	NR	JV	M	C	CHM	RBCE	BL		200	N	0.523	N	0.04032		15.4	10	10	10	5	5	1	4	10	10	7	72
31	2830	Rader et al., 1981	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/15.54	mg/kg bw/d	N		1 per w	U	OR	6	w	NR	NR	JV	M	C	ENZ	ALAD	UR		15.5	Y	0.475	N	0.03726		15.5	10	8	5	5	10	1	4	10	10	4	67
32	14821	Gelman and Michaelson, 1979	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/25/75/225	mg/kg bw/d	N		1 per d	U	GV	19	d	2	d	JV	B	C	CHM	HMCT	BL		25.0	Y	0.3	N	0.02554		25.0	10	8	10	5	10	1	4	10	10	4	72
33	21095	Singh et al, 1994	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/50/100	mg/kg bw/d	N		DLY	U	GV	1	mo	NR	NR	JV	F	C	CHM	POTA	BL		50.0	Y	0.15	N	0.01444		50.0	10	8	10	5	10	1	4	10	10	4	72
34	2528	Batra et al., 1998	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/50	mg/kg bw/d	N		DLY	U	GV	3	mo	8	w	SM	M	C	ENZ	ALAD	TE		50.0	Y	0.15	N	0.01444		50.0	10	8	10	5	10	1	4	10	10	4	72
35	2929	White, 1977	Lead carbonate	100	Dog (*Canis familiaris*)	3	0/50/100	mg/kg bw	N		DLY	U	OR	1	w	<1	yr	JV	NR	C	ENZ	DHYD	KI		50.0	N	10.45	N	0.4728		50.0	10	8	10	10	10	1	4	10	10	4	77
36	3747	Azar et al., 1973	lead acetate	100	Rat (*Rattus norvegicus*)	3	0/1130/2102	mg/kg diet	N		NR	M	FD	2	yr	NR	NR	NR	B	C	ENZ	ALAD	BL		1130	N	0.51	N	0.0395		87.5	10	10	10	5	5	1	4	10	10	4	69
37	2806	Rudra Pal et al., 1975	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/100	mg/kg bw/d	N		NR	U	FD	4	w	NR	NR	NR	M	C	CHM	HMGL	BL		100	Y	0.11	N	0.01119		100	10	10	5	5	10	1	4	10	10	4	69
38	2870	Shailesh Kumar and Desiraju, 1990	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/100/400	mg/kg bw	N		6 per w	U	GV	58	d	2	d	JV	B	C	HRM	DOPA	BR		100	Y	0.075	N	0.00817		100	10	8	10	5	10	1	4	10	10	4	72
39	14376	Hsu et al, 1975	Lead acetate	100	Pig (*Sus scrofa*)	2	0/1000	mg/kg diet	N		ADL	U	FD	2	w	4	w	JV	NR	NR	CHM	CALC	SR		1000	Y	7.5	Y	1.296		173	10	10	5	5	7	1	4	10	10	4	66
40	3937	Yagminas et al., 1990	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg bw/d	N		5 per w	U	GV	91	d	NR	NR	JV	M	C	CHM	BUNT	BL		200	Y	0.454	N	0.0359		200	10	8	10	5	10	1	4	10	10	4	72
41	2911	Toews et al., 1983	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/400	mg/kg bw/d	N		6 per w	U	GV	28	d	2	d	JV	M	C	CHM	PRTL	BR		400	Y	0.075	N	0.00817		400	10	8	10	5	10	1	4	10	10	4	72
42	2697	Holtzman et al., 1982	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/400/800/1200	mg/kg bw/d	N		DLY	U	GV	14	d	24	d	JV	NR	C	CHM	PCLV	BL		400	N	0.267	N	0.0232		400	10	8	10	5	10	1	4	10	10	4	72
43	2697	Holtzman et al., 1982	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/1600/2000/2400	mg/kg bw/d	N		DLY	U	GV	14	d	16	d	JV	NR	C	CHM	PCLV	BL		1600	N	0.267	N	0.0232		1600	10	8	10	5	10	1	4	10	10	4	72
Behavior																																												
44	2593	Dilts and Ahokas, 1979	Lead acetate	100	Rat (*Rattus norvegicus*)	6	0/10/50/100/200/500	mg/L	N		ADL	U	DR	21	d	NR	NR	GE	F	C	FDB	FCNS	WO	10.0	50.0	Y	0.370	Y	0.037	1.00	5.00	10	5	5	5	7	4	8	10	10	4	68
45	820	Sawicka-Kapusta et al., 1987	Lead nitrate	100	Bank vole (*Clethrionomys glareolu*	3	0/1.1/34.6	mg/kg bw/d	N		DLY	M	FD	20	d	NR	NR	AD	B	C	FDB	FCNS	WO	1.10	34.6	Y	0.0195	N	Variable	1.10	34.6	10	10	10	10	7	4	10	10	6	4	80
46	15125	Morris et al, 1938	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/1269/9307.8	ug/org/d	N		ADL	U	FD	339	d	26-27	d	JV	B	C	FDB	FCNS	WO	1269	9308	Y	0.509	N	0.03943	2.49	18.3	10	10	5	5	6	4	8	10	10	4	74
47	2675	Hammond et al., 1989	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/50/250/500	mg/L	N		ADL	U	DR	23	d	22	d	JV	F	C	FDB	WCON	WO	50.0	250	N	0.204	N	0.02368	5.80	29.0	10	5	5	5	5	4	8	10	10	7	69
48	3711	Lynch et al., 1976	Lead carbonate	100	Cattle (*Bos taurus*)	3	0/4.16/7.79	mg/kg bw/d	N		3 per w	U	OR	84	d	NR	NR	JV	M	C	FDB	FCNS	WO	7.79		Y	80.2	Y	0.157	7.79		10	8	10	10	10	4	4	3	10	4	73
49	14580	Mahaffey et al., 1977	lead acetate	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg diet	N		ADL	UX	FD	10	w	NR	NR	JV	M	C	FDB	FCNS	WO	200		N	0.523	N	0.04032	15.4		10	10	10	5	5	4	4	10	10	7	75
50	2756	Mahaffey et al., 1973	Lead acetate	100	Rat (*Rattus norvegicus*)	7	0/0.19/0.70/2.8/5.9/12.9/24.3	mg/kg bw/d	N		NR	U	DR	10	w	NR	NR	JV	M	C	FDB	FCNS	WO	24.3		Y	0.31	N	0.0345	24.3		10	5	5	5	10	4	4	10	10	4	67
51	3889	Logner et al., 1984	Lead sulfate	100	Cattle (*Bos taurus*)	4	0/16/43/305	mg/kg bw/d	N		DLY	U	FD	7	w	74	d	JV	M	C	FDB	FCNS	WO	43.0		Y	137.43	Y	3.64	43.0		10	10	5	10	10	4	4	3	10	4	70

Appendix 6.1 Mammalian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
Lead

Ref			Exposure																			Effects					Conversion to mg/kg bw/day				Result		Data Evaluation Score											
Result #	Ref N.		Chemical Form	MW%	Test Species	# of Conc/ Doses	Conc/ Doses	Conc/Dose Units	Wet Weight Reported?	Percent Moisture	Application Frequency	Method of Analyses	Route of Exposure	Exposure Duration	Duration Units	Age	Age Units	Lifestage	Sex	Control Type	Effect Type	Effect Measure	Response Site	Study NOAEL	Study LOAEL	Body Weight Reported?	Body Weight in kg	Ingestion Rate Reported?	Ingestion Rate in kg or L/day	NOAEL Dose (mg/kg/day)	LOAEL Dose (mg/kg/day)	Data Source	Dose Route	Test Concentrations	Chemical form	Dose Quantification	Endpoint	Dose Range	Statistical Power	Exposure Duration	Test Conditions	Total
52	2889	Sourgens et al., 1987	Lead acetate trihydrate	54.61	Rat (*Rattus norvegicus*)	4	0/45/900/4580	mg/L	N		ADL	U	DR	30	d	NR	NR	JV	B	C	FDB	WCON	WO	900	4580	Y	0.246	N	0.02802	56.0	285	10	5	5	5	6	4	8	10	10	4	67
53	2923	Vyskocil et al., 1995	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/81.3/320	mg/kg bw/d	N		ADL	U	DR	2	mo	9-10	w	SM	F	C	FDB	WCON	WO	81.3	320	Y	0.25	N	0.02843	81.3	320	10	5	5	5	10	4	8	10	10	4	71
54	2870	Shailesh Kumar and Desiraju, 1990	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/100/400	mg/kg bw	N		6 per w	U	GV	58	d	2	d	JV	B	C	FDB	FCNS	WO	100	400	Y	0.075	N	0.00817	100	400	10	8	10	5	10	4	8	10	10	4	79
55	2758	Maker et al., 1973	Lead carbonate	100	Mouse (*Mus musculus*)	7	0/0.08/0.16/0.4/0.5/1.0/2.0	% in diet	N		NR	U	FD	28	d	NR	NR	LC	F	C	AVO	FOOD	WO	0.0800	0.160	N	0.0325	N	0.00411	101	202	10	10	5	5	5	4	10	10	10	4	73
56	2758	Maker et al., 1973	Lead carbonate	100	Mouse (*Mus musculus*)	7	0/0.08/0.16/0.4/0.5/1.0/2.0	% in diet	N		NR	U	FD	28	d	NR	NR	LC	F	C	AVO	FOOD	WO	0.0800	0.160	N	0.0325	N	0.00411	101	202	10	10	5	5	5	4	10	10	10	4	73
57	2888	Sokol et al., 1985	Lead acetate	54.61	Rat (*Rattus norvegicus*)	3	0/0.1/0.3	% water	N		ADL	U	DR	30	d	52	d	JV	M	C	FDB	WCON	WO	0.100	0.300	N	0.33188	Y	0.103	169	508	10	5	5	5	7	4	10	10	10	4	70
58	3937	Yagminas et al., 1990	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg bw/d	N		5 per w	U	GV	91	d	NR	NR	JV	M	C	FDB	FCNS	WO	200		Y	0.454	N	0.0359	200		10	8	10	5	10	4	4	1	10	4	66
59	633	Lockett and Leary, 1986	Lead	100	Rat (*Rattus norvegicus*)	2	0/5	mg/L	N		ADL	UX	DR	16	mo	NR	NR	JV	M	C	BEH	ACTV	WO		5.00	N	0.217	N	0.02503		0.577	10	5	10	4	5	4	4	10	10	4	66
60	2502	Wolfe et al, 1996	Lead acetate trihydrate	100	Rat (*Rattus norvegicus*)	5	0/23.03/47.26/81.96/206.52	mg/kg bw/d	N		ADL	M	DR	1	w	94	d	JV	M	C	FDB	WCON	WO		23.0	Y	0.40311	Y	0.0297		23.0	10	5	10	5	10	4	4	10	10	4	72
61	2677	Hammond et al., 1993	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/250	mg/L	N		ADL	U	DR	26	d	22	d	JV	F	V	FDB	WCON	WO		250	Y	0.175	N	0.02062		29.5	10	5	5	5	6	4	4	10	10	7	66
62	2677	Hammond et al., 1993	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/250	mg/L	N		ADL	U	DR	14	d	26	d	JV	F	V	FDB	WCON	WO		250	Y	0.15	N	0.01795		29.9	10	5	5	5	6	4	4	10	10	7	66
63	12025	Kishi et al., 1983	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/45/90/180	mg/kg bw	N		DLY	U	GV	18	d	3	d	JV	M	C	BEH	RRSP	WO		45	Y	0.0503	N	0.00588		45.0	10	8	10	5	10	4	4	10	10	4	75
64	617	Nation et al., 1990	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/500	mg/kg diet	N		ADL	U	FD	61	d	50	d	JV	M	C	BEH	ACTP	WO		500	Y	0.2	N	0.0183		45.7	10	10	5	5	6	4	4	10	10	4	68
65	2807	Pankakoski et al., 1994	Lead	100	Shrew (*Sorex araneus*)	4	0/371/423/1052	mg/kg diet	N		ADL	M	FD	31	d	NR	NR	JV	B	C	FDB	FCNS	WO		371	Y	0.0071	N	0.00118		61.5	10	10	10	4	6	4	4	10	10	4	72
66	2502	Wolfe et al, 1996	Lead acetate trihydrate	100	Rat (*Rattus norvegicus*)	2	0/0.3	mg/kg bw/d	N		ADL	M	DR	1	w	99	d	JV	B	C	FDB	WCON	WO		194	Y	0.455	Y	0.02179		194	10	5	10	5	10	4	4	10	10	4	72
67	2669	Hallen et al., 1995	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg bw	N		NR	U	DR	13	w	NR	NR	GE	F	C	FDB	WCON	WO		200	Y	0.2	N	0.02326		200	10	5	5	5	10	4	4	10	10	4	67
68	2817	Piasekand Kostial, 1987	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/216/420/639.36	mg/kg bw/d	N		ADL	U	DR	18	w	NR	NR	JV	M	C	FDB	WCON	WO		216	Y	0.25	Y	0.04		216	10	5	5	5	10	4	4	10	10	4	67
69	10239	Barrett and Livesey, 1983	Lead	100	Rat (*Rattus norvegicus*)	4	0/0.2/0.4/1.0	% in diet	N		DLY	U	FD	10	d	NR	NR	LC	F	C	BEH	ACTV	WO		0.200	Y	0.324	Y	0.05235		323	10	10	5	10	7	4	4	10	10	4	74
70	2818	Piasek and Kostial 1991	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/750	mg/kg bw/d	N		NR	U	DR	20	w	10	w	GE	F	C	FDB	WCON	WO		750	Y	0.2681	N	0.03028		750	10	5	5	5	10	4	4	10	10	4	67
71	2837	Gulati et al, 1985	Lead acetate trihydrate	100	Mouse (*Mus musculus*)	4	0/4.98/10.055/20.52	mg/ml	Y		ADL	M	DR	1	w	11	w	JV	F	C	FDB	WCON	WO		4.98	Y	0.028	Y	0.00414		775	10	5	10	5	7	4	4	10	10	4	69
72	2774	Michaelson and Sauerhoff, 1974	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/5	% in diet	N		ADL	U	FD	18	d	NR	NR	LC	F	C	FDB	FCNS	WO		5.00	N	0.35	Y	0.0432		6170	10	10	5	5	6	4	4	10	10	4	68
Physiology																																												
73	21113	Boscolo et al, 1992	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/15/30/60	mg/L	N		ADL	U	DR	14	mo	NR	NR	JV	M	C	PHY	BLPR	BL	15.0	30.0	N	0.267	N	0.03016	1.69	3.39	10	5	5	5	5	4	10	10	10	4	68
74	820	Sawicka-Kapusta et al., 1987	Lead nitrate	100	Bank vole (*Clethrionomys glareolu*	3	0/1.1/34.6	mg/kg bw/d	N		DLY	M	FD	20	d	NR	NR	AD	B	C	PHY	GPHY	WO	34.6		Y	0.022	N	Variable	34.6		10	10	10	10	10	4	4	1	6	4	69
75	3889	Logner et al., 1984	Lead sulfate	100	Cattle (*Bos taurus*)	4	0/16/43/305	mg/kg bw/d	N		DLY	U	FD	7	w	74	d	JV	M	C	PHY	BTMP	WO	43.0		Y	137.43	Y	3.64	43.0		10	10	5	10	10	4	4	8	10	4	75
76	2829	Rader et. al. 1981	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/16.1	mg/kg bw/d	N		NR	U	DR	5	w	NR	NR	JV	M	C	PHY	EXCR	UR		16.1	Y	0.341	N	0.03759		16.1	10	5	5	5	10	4	4	10	10	4	67
77	2806	Rudra Pal et al., 1975	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/100	mg/kg bw/d	N		NR	U	FD	4	w	NR	NR	JV	M	C	PHY	EXCR	UR		100	Y	0.11	N	0.01119		100	10	10	5	5	10	4	4	10	10	4	72
Pathology																																											
78	3873	Horwitt and Cowgill, 1937	Lead acetate	100	Dog (*Canis familiaris*)	3	0/27/102	mg/kg diet	N		DLY	M	FD	2	mo	NR	NR	JV	NR	C	HIS	GHIS	BL	27.0	102	Y	12.8	N	0.55858	1.18	4.45	10	10	10	5	6	4	8	10	10	4	77
79	2789	Nehru and Kaushal, 1991	Lead acetate	54.61	Rat (*Rattus norvegicus*)	4	0/2.5/5/25	mg/kg bw/d	N		DLY	U	GV	3	mo	NR	NR	NR	F	C	HIS	GHIS	KI	2.50	5.00	N	0.4	N	0.03235	1.37	2.73	10	8	10	5	10	4	10	10	10	4	81
80	15125	Morris et al, 1938	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/1269/9307.8	ug/org/d	N		ADL	U	FD	339	d	26-27	d	JV	B	C	ORW	ORWT	KI	1269	9307.8	Y	0.509	N	0.03943	2.49	18.3	10	10	5	5	6	4	8	10	10	4	72
81	11831	Jessup and Shott, 1969	Lead acetate	100	Rat (*Rattus norvegicus*)	5	0/10/50/100/1000	mg/kg diet	N		ADL	U	FD	92	w	3	d	JV	B	C	ORW	SMIX	HE	50.0	100	Y	0.615	N	0.04607	3.75	7.49	10	10	5	5	6	4	10	10	10	4	74
82	2751	Lorenzo et al., 1978	Lead nitrate	62.56	Rabbit (*Oryctolagus cuniculus*)	3	0/6.08/28.44	mg/kg bw/d	N		DLY	U	GV	30	d	1	d	JV	F	C	HIS	NCRO	KI	6.08	28.4	N	3.1	N	0.17412	6.08	28.4	10	8	10	10	5	4	8	10	10	4	79
83	2876	Sierra and Tiffany-Castiglioni, 1992	Lead acetate	100	Guinea pig (Cavia porcellus)	3	0/5.5/11.0	mg/kg bw/d	N		DLY	U	DR	40	d	NR	NR	GE	F	C	ORW	ORWT	BR	11.0		Y	1.0	N	0.099	11.0		10	5	5	5	10	4	4	10	10	4	67
84	2830	Rader et al., 1981	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/15.1	mg/kg bw/d	N		ADL	U	DR	6	w	NR	NR	JV	M	C	ORW	ORWT	BR	15.1		Y	0.337	N	0.0372	15.1		10	5	5	5	10	4	4	10	10	4	67
85	3889	Logner et al., 1984	Lead sulfate	100	Cattle (*Bos taurus*)	4	0/16/43/305	mg/kg bw/d	N		DLY	U	FD	32	d	74	d	JV	M	C	ITX	PARL	WO	16.0	43.0	Y	118.07	Y	3.64	16.0	43.0	10	10	5	10	10	4	10	10	10	4	83
86	2829	Rader et. al. 1981	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/16.1	mg/kg bw/d	N		NR	U	DR	7	w	NR	NR	JV	M	C	ORW	ORWT	BR	16.1		Y	0.341	N	0.03759	16.1		10	5	5	10	10	4	4	10	10	4	72
87	2502	Wolfe et al, 1996	Lead acetate trihydrate	100	Rat (*Rattus norvegicus*)	5	0/21.5/42.97/85.34/243.39	mg/kg bw/d	N		ADL	M	DR	4	w	94	d	JV	F	C	ORW	ORWT	KI	21.5	43.0	Y	0.305	Y	0.034	21.5	43.0	10	5	10	5	10	4	4	10	10	4	78
88	14799	Goyer et al., 1970	Lead acetate	100	Rat (*Rattus norvegicus*)	6	0/2.3/7.0/12/21/67/220	mg/org/d	N		NR	U	DR	10	w	NR	NR	JV	M	C	HIS	IIBD	KI	7.00	12.0	Y	0.175	N	0.02062	40.0	68.6	10	5	5	5	6	4	10	10	10	4	69
89	2507	Agodi et al., 1990	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/50	mg/kg bw	N		DLY	U	GV	28	d	2	d	JV	B	V	ORW	ORWT	BR	50.0		Y	0.0531	N	0.00615	50.0		10	8	10	5	10	4	4	10	10	4	75
90	2923	Vyskocil et al., 1995	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/81.3/320	mg/kg bw/d	N		ADL	U	DR	1	mo	9-10	w	SM	F	C	ORW	SMIX	KI	81.3	320	Y	0.25	N	0.02843	81.3	320	10	5	5	5	10	4	8	10	10	4	71
91	2815	Petrusz et al., 1979	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/25/100/200	mg/kg bw/d	N		DLY	U	GV	18	d	2	d	JV	B	C	ORW	ORWT	PI	200		N	0.035	N	0.00437	200		10	8	10	5	10	4	4	1	10	4	66
92	2511	Alfano and Petit, 1982	Lead carbonate	77.55	Rat (*Rattus norvegicus*)	3	0/0.4/4.0	% in diet	N		ADL	U	FD	25	d	NR	NR	LC	F	C	GRS	BDWT	WO	0.400	4.00	N	0.344	N	0.0286	258	2580	10	10	5	10	5	4	8	10	10	4	76
93	2697	Holtzman et al., 1982	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/400/800/1600	mg/kg bw/d	N		DLY	U	GV	14	d	16	d	JV	NR	C	HIS	ENCP	BR	400	800	N	0.267	N	0.0232	400	800	10	8	10	5	10	4	10	10	10	4	81
94	2697	Holtzman et al., 1982	Lead acetate	100	Rat (*Rattus norvegicus*)	5	0/400/800/1600/2400	mg/kg bw/d	N		DLY	U	GV	14	d	18	d	JV	NR	C	HIS	ENCP	BR	400	800	N	0.267	N	0.0232	400	800	10	8	10	5	10	4	10	10	10	4	81
95	14822	Gerber et al, 1978	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/0.5	% in diet	N		NR	U	FD	14	mo	0	d	JV	NR	C	ORW	ORWT	BR	0.500		Y	0.278	N	0.024	431		10	10	5	5	6	4	4	10	10	4	68
96	2697	Holtzman et al., 1982	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/1600/2000/2400	mg/kg bw/d	N		DLY	U	GV	14	d	18	d	JV	NR	C	HIS	ENCP	BR	2400		N	0.267	N	0.0232	2400		10	8	10	5	10	4	4	10	10	4	75
97	2697	Holtzman et al., 1982	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/2400/3200	mg/kg bw/d	N		DLY	U	GV	14	d	14	d	JV	NR	C	HIS	ENCP	BR	3200		N	0.267	N	0.0232	3200		10	8	10	5	10	4	4	1	10	4	66
98	1858	Schroeder and Mitchener, 1975	Lead acetate	100	Mouse (*Mus musculus*)	2	0/25	mg/L	N		NR	U	DR	520	d	19-20	d	JV	F	C	HIS	EDMA	WO		25.0	Y	0.0427	N	0.00579		3.39	10	5	5	10	6	4	4	10	10	4	68
99	2788	Nehru et al., 1997	Lead	100	Rat (*Rattus norvegicus*)	2	0/20	mg/kg bw	N		EOD	U	GV	8	w	NR	NR	JV	F	C	ORW	ORWT	BR		10.0	Y	0.18125	N	0.01688		10.0	10	8	10	4	10	4	4	10	3	4	67
100	14580	Mahaffey et al., 1977	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg diet	N		ADL	UX	FD	10	w	NR	NR	JV	M	C	ORW	SMIX	KI		200	N	0.523	N	0.04032		15.4	10	10	10	5	5	4	4	10	10	7	75
101	2830	Rader et al., 1981	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/15.54	mg/kg bw/d	N		1 per w	U	OR	6	w	NR	NR	AD	M	C	ORW	ORWT	BR		15.5	Y	0.475	N	0.03726		15.5	10	8	5	5	10	4	4	10	10	4	70
102	14803	Wells, et.al, 1986	Lead acetate	100	Cattle (*Bos taurus*)	2	0/20	mg/kg bw/d	N		DLY	U	DR	8	d	3	mo	JV	M	C	HIS	GLSN	BR		20.0	N	na	N	na		20.0	10	5	5	5	10	4	4	10	10	4	67

Ref			Exposure																				Effects					Conversion to mg/kg bw/day				Result		Data Evaluation Score												
Result #	Ref N.		Chemical Form	MW%	Test Species	# of Conc/ Doses	Conc/ Doses	Conc/Dose Units	Wet Weight Reported?	Percent Moisture	Application Frequency	Method of Analyses	Route of Exposure	Exposure Duration	Duration Units	Age	Age Units	Lifestage	Sex	Control Type	Effect Type	Effect Measure	Response Site	Study NOAEL	Study LOAEL	Body Weight Reported?	Body Weight in kg	Ingestion Rate Reported?	Ingestion Rate in kg or L/day	NOAEL Dose (mg/kg/day)	LOAEL Dose (mg/kg/day)	Data Source	Dose Route	Test Concentrations	Chemical form	Dose Quantification	Endpoint	Dose Range	Statistical Power	Exposure Duration	Test Conditions	Total
103	3879	Karmakar et al., 1986	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/44	mg/kg bw/d	N		NR	U	GV	30	d	NR	NR	AD	B	C	HIS	GHIS	MT		44.0	Y	0.3	N	0.02554		44.0	10	8	10	5	10	4	4	10	10	4	75
104	20974	Al-Omar et al, 2000	Lead oxide	92.83	Mouse (*Mus musculus*)	2	0/50	mg/kg bw/d	N		DLY	M	GV	5	w	NR	NR	JV	M	V	HIS	USTR	SV		50.0	Y	0.02063	N	0.00283		46.4	10	8	10	10	10	4	4	10	10	4	80
105	2929	White, 1977	Lead carbonate	100	Dog (*Canis familiaris*)	2	0/50	mg/kg bw	N		DLY	U	OR	5	w	<1	yr	JV	NR	C	HIS	GHIS	LI		50.0	N	10.45	N	0.4728		50.0	10	8	10	10	10	4	4	10	10	4	80
106	2807	Pankakoski et al., 1994	Lead	100	Shrew (*Sorex araneus*)	4	0/371/423/1052	mg/kg diet	N		ADL	M	FD	31	d	NR	NR	JV	B	C	HIS	GHIS	KI		371	Y	0.0071	N	0.00118		61.5	10	10	10	4	6	4	4	10	10	4	72
107	2806	Rudra Pal et al., 1975	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/100	mg/kg bw/d	N		NR	U	FD	4	w	NR	NR	JV	M	C	ORW	SMIX	KI		100	Y	0.11	N	0.01119		100	10	10	5	5	10	4	4	10	10	4	72
108	2870	Shailesh Kumar and Desiraju, 1990	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/100/400	mg/kg bw	N		6 per w	U	GV	58	d	2	d	JV	B	C	ORW	ORWT	BR		100	Y	0.075	N	0.00817		100	10	8	10	5	10	4	4	10	10	4	75
109	2548	Brown, 1974	Lead acetate	54.61	Rabbit (*Oryctolagus cuniculus*)	2	0/5000	mg/kg diet	N		ADL	U	FD	5	mo	5	mo	JV	B	C	HIS	GHIS	EY		5000	Y	3.2	N	0.17873		153	10	10	5	5	6	4	4	10	10	4	68
110	2502	Wolfe et al, 1996	Lead acetate trihydrate	100	Rat (*Rattus norvegicus*)	2	0/171.27	mg/kg bw/d	N		ADL	M	DR	4	w	99	d	JV	M	C	ORW	ORWT	AR		171	Y	0.51751	Y	0.02276		171	10	5	10	5	10	4	4	10	10	4	72
111	2680	Harry et al., 1985	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg bw	N		DLY	U	GV	29	d	2	d	JV	F	V	ORW	ORWT	BR		200	Y	0.065	N	0.00726		200	10	8	10	5	10	4	4	10	10	4	75
112	3937	Yagminas et al., 1990	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg bw/d	N		5 per w	U	GV	91	d	NR	NR	JV	M	C	ORW	ORWT	KI		200	Y	0.454	N	0.0359		200	10	8	10	5	10	4	4	10	10	4	75
113	2827	Press 1975	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/328	mg/kg bw/d	N		DLY	U	GV	7	d	1	d	JV	B	C	ITX	PARL	WO		328	N	0.248	N	0.02184		328	10	8	10	5	10	4	4	10	10	4	75
114	2697	Holtzman et al., 1982	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/400/800/1200	mg/kg bw/d	N		DLY	U	GV	14	d	20	d	JV	NR	C	HIS	ENCP	BR		400	N	0.267	N	0.0232		400	10	8	10	5	10	4	4	10	10	4	75
115	2911	Toews et al., 1983	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/400	mg/kg bw/d	N		6 per w	U	GV	28	d	2	d	JV	M	C	ORW	ORWT	BR		400	Y	0.075	N	0.00817		400	10	8	10	5	10	4	4	10	10	4	75
116	2546	Brashear et al., 1978	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/1.0	g/kg bw/d	N		DLY	U	GV	18	d	2	d	JV	B	C	ORW	ORWT	BR		1.00	N	0.248	N	0.02184		1000	10	8	10	10	4	4	10	10	4	80
117	14822	Gerber et al, 1978	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/1.0	% in diet	N		NR	U	FD	1	mo	0	d	JV	NR	C	ORW	ORWT	BR		1.00	Y	0.0406	N	0.0049		1220	10	10	5	5	6	4	4	10	10	4	68
118	2604	Dyck et al., 1980	Lead carbonate	77.55	Rat (*Rattus norvegicus*)	2	0/4	% in diet	N		NR	U	FD	12	w	NR	NR	AD	NR	C	HIS	GHIS	NE		4.00	Y	0.25	N	0.0220		2730	10	10	5	10	6	4	4	10	3	4	66
119	2782	Myers et al., 1979	Lead carbonate	77.55	Rat (*Rattus norvegicus*)	2	0/6	% in diet	N		NR	U	FD	7	w	NR	NR	AD	B	C	HIS	GHIS	NE		6.00	N	0.5	N	0.03886		3620	10	10	5	10	5	4	4	10	10	4	72
120	2774	Michaelson and Sauerhoff, 1974	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/5	% in diet	N		ADL	U	FD	17	d	NR	NR	LC	F	C	GRS	BDWT	WO		5.00	N	0.35	N	0.0432		6170	10	10	5	5	6	4	4	10	10	4	68
Reproduction																																													
121	2658	Grant et al., 1980	Lead acetate	100	Rat (*Rattus norvegicus*)	5	0/0.07/0.71/7/38	mg/kg bw/d	N		ADL	U	DR	62	d	21	d	GE	F	C	REP	PRWT	WO	0.710	7.00	Y	0.325	N	0.036	0.710	7.00	10	5	5	5	10	10	8	10	10	4	77
122	2593	Dilts and Ahokas, 1979	Lead acetate	100	Rat (*Rattus norvegicus*)	6	0/10/50/100/200/500	mg/L	N		ADL	U	DR	21	d	NR	NR	GE	F	C	REP	PRWT	WO	10.0	50.0	Y	0.370	Y	0.037	1.00	5.00	10	5	5	5	7	10	8	10	10	4	74
123	2642	Gandley et al., 1999	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/25/250	mg/L	N		ADL	U	DR	35	d	NR	NR	AD	M	C	REP	RSUC	WO	25.0	250	N	0.6	N	0.06251	2.60	26.0	10	5	5	5	5	10	8	10	10	4	72
124	2658	Grant et al., 1980	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/0.64/3/6	mg/kg bw/d	N		ADL	U	DR	62	d	21	d	GE	B	C	REP	PRWT	WO	3.00	6.00	Y	0.29	N	0.03249	3.00	6.00	10	5	5	5	10	10	10	10	10	4	79
125	3830	Carson et al., 1973	Lead	100	Sheep (*Ovis aries*)	3	0/2.3/4.5	mg/kg bw/d	N		DLY	U	FD	27	w	NR	NR	GE	F	C	REP	RSUC	WO	4.50		N	na	Y	0.227	4.50		10	10	5	4	10	10	4	1	10	4	68
126	2592	Dilts and Ahokas, 1980	Lead acetate	100	Rat (*Rattus norvegicus*)	6	0/10/50/100/200/500	mg/L	N		ADL	U	DR	21	d	NR	NR	GE	F	C	REP	PRWT	WO	50.0	100	Y	0.3	Y	0.03	5.00	10.0	10	5	5	5	7	10	10	10	10	4	76
127	2876	Sierra and Tiffany-Castiglioni, 1992	Lead acetate	100	Guinea pig (*Cavia porcellus*)	3	0/5.5/11.0	mg/kg bw/d	N		DLY	U	DR	40	d	NR	NR	GE	F	C	REP	PRWT	WO	5.50		N	1.0	N		5.50		10	5	5	5	10	10	4	10	10	4	73
128	11831	Jessup and Shott, 1969	Lead acetate	100	Rat (*Rattus norvegicus*)	5	0/10/50/100/1000	mg/kg diet	N		ADL	U	FD	92	w	21	d	JV	M	C	REP	TEWT	TE	100	1000	Y	0.615	N	0.0461	7.50	74.9	10	10	5	5	6	10	8	10	10	4	78
129	2737	Kimmel et al., 1980	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/0.92/4.7/8.9	mg/kg bw/d	N		ADL	U	DR	28.3	d	21	d	LC	F	V	REP	Other	WO	8.90		Y	0.3	N	0.0335	8.90		10	5	5	5	10	10	4	10	10	7	76
130	2737	Kimmel et al., 1980	Lead acetate	100	Rat (*Rattus norvegicus*)	5	0/0.09/0.92/9.1/45	mg/kg bw/d	N		ADL	U	DR	28.3	d	21	d	GE	F	V	REP	Other	WO	9.10	45.0	Y	0.325	N	0.036	9.10	45.0	10	5	5	5	10	10	4	10	10	4	73
131	2770	McMurry et al., 1995	Lead acetate	100	Cotton rat (*Sigmodon hispidus*)	3	0/2.1/28.8	mg/org	N		ADL	U	DR	7	w	NR	NR	AD	M	C	REP	RHIS	RT	2.10	28.8	Y	0.1698	N	na	12.4	170	10	5	5	5	6	10	6	10	6	4	67
132	2524	Barratt et al., 1989	Lead acetate	54.61	Rat (*Rattus norvegicus*)	4	0/0.3/33/300	mg/kg bw	N		DLY	U	GV	9	w	10	w	JV	M	C	REP	SPCV	TE	33.0	330	N	0.217	N	0.01957	18.0	180	10	8	10	5	10	10	8	10	10	4	85
133	2943	Zenick et al., 1979	Lead acetate	54.61	Rat (*Rattus norvegicus*)	3	0/200/400	mg/kg	N		DLY	U	DR	100	d	21	d	GE	F	C	REP	PRWT	WO	400		N	0.204	N	0.0237	25.4		10	5	5	5	5	10	4	10	10	4	68
134	10607	Cerklewski, 1980	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/250	mg/kg diet	N		NR	U	FD	35	d	70	d	LC	F	C	REP	PRWT	WO	250		Y	0.363	Y	0.04	27.5		10	10	5	5	7	10	4	1	10	4	66
135	3721	Chowdhury et al., 1984	Lead acetate	54.61	Rat (*Rattus norvegicus*)	4	0/0.25/0.5/1.0	g/L	N		ADL	U	DR	60	d	NR	NR	SM	M	C	REP	TEWT	TE	0.500	1.00	Y	0.21143	N	0.02445	31.6	63.2	10	5	5	5	6	10	10	10	6	4	71
136	14812	Bull, et.. al., 1978	Lead chloride	100	Rat (*Rattus norvegicus*)	4	0/0.8/4.0/32.5	mg/kg bw/d	N		ADL	U	DR	56	d	70	d	LC	F	C	REP	PROG	WO	32.5		N	0.2024	N	0.02351	32.5		10	5	5	10	10	10	4	1	10	4	69
137	2934	Winder et al., 1984	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/300/1000	mg/L	N		ADL	U	DR	31	d	NR	d	LC	F	C	REP	PRWT	WO	300	1000	N	0.32	N	0.0355	33.3	111	10	5	5	5	5	10	10	8	10	4	72
138	2775	Miller et al., 1982	Lead acetate	54.61	Rat (*Rattus norvegicus*)	4	0/50/75/100	mg/kg bw	N		DLY	U	GV	41	d	NR	NR	GE	F	C	REP	PRWT	WO	75.0	100	N	0.35	N	0.02899	41.0	54.6	10	8	10	5	10	10	10	10	10	4	87
139	2502	Wolfe et al, 1996	Lead acetate trihydrate	100	Rat (*Rattus norvegicus*)	5	0/23.03/47.26/81.96/206.52	mg/kg bw/d	N		ADL	M	DR	1	w	94	d	JV	M	C	REP	SPCL	SM	47.3	82.0	Y	0.404	Y	0.044	47.3	82.0	10	5	10	5	10	10	10	10	10	4	84
140	2889	Sourgens et al., 1987	Lead acetate trihydrate	54.61	Rat (*Rattus norvegicus*)	4	0/45/900/4580	mg/L	N		ADL	U	DR	30	d	NR	NR	SM	M	C	REP	Other	SV	900	4580	Y	0.246	N	0.02802	56.0	285	10	5	5	5	6	10	8	10	10	4	73
141	2565	Carpenter, 1982	Lead acetate	100	Hamster (*Mesocricetus auratus*)	2	0/547	mg/L	N		ADL	U	DR	51	d	15	w	GE	F	C	REP	PROG	WO	547		Y	0.167	N	0.0198	64.8		10	5	5	5	6	10	4	10	10	4	69
142	2565	Carpenter, 1982	Lead acetate	100	Hamster (*Mesocricetus auratus*)	2	0/547	mg/L	N		ADL	U	DR	14	d	11	w	GE	F	C	REP	PROG	WO	547		Y	0.163	N	0.0193	64.9		10	5	5	5	6	10	4	8	10	4	67
143	2847	Ronis et al., 1998	Lead acetate	54.61	Rat (*Rattus norvegicus*)	4	0/0.05/0.15/0.45	% in water	N		ADL	U	DR	37	d	NR	NR	GE	F	C	REP	PRWT	WO	0.150	0.450	N	0.35	N	0.03849	90.1	270	10	5	5	5	5	10	10	10	10	4	74
144	748	Wardell et al., 1982	Lead acetate	100	Rat (*Rattus norvegicus*)	5	0/10/50/100/150	mg/kg bw/d	N		DLY	U	GV	12	d	NR	NR	GE	F	C	REP	RSEM	EM	100	150	Y	0.2	N	0.0183	100	150	10	8	10	5	10	10	10	10	10	4	87
145	2670	Hamilton and O'Flaherty, 1994	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/250/1000	mg/L	N		ADL	U	DR	68	d	25	d	GE	F	V	REP	PRWT	WO	1000		Y	0.224	N	0.02575	115		10	5	5	5	6	10	4	10	10	7	72
146	2671	Hamilton et al., 1994	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/250/500/1000	mg/L	N		ADL	U	DR	77	d	25	d	GE	F	V	REP	PRWT	WO	1000		N	0.202	N	0.02346	116		10	5	5	5	5	10	4	10	10	4	68
147	2633	Fox et al., 1977	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/1092	mg/L	N		ADL	U	DR	21	d	NR	NR	LC	F	C	REP	PRWT	WO	1092		N	0.344	N	0.03789	120		10	5	5	5	5	10	4	10	10	4	68
148	2618	Eyden et al, 1978	Lead acetate	100	Mouse (*Mus musculus*)	3	0/0.1/1.0	% in diet	N		ADL	U	FD	8	w	2	mo	GE	M	C	REP	SPCV	TE	0.100	1.00	Y	0.0158	N	0.00227	144	1440	10	10	5	5	6	10	8	10	10	4	78
149	2758	Maker et al., 1973	Lead carbonate	100	Mouse (*Mus musculus*)	7	0/0.08/0.16/0.4/0.5/1.0/2.0	% in diet	N		NR	U	FD	30	d	NR	NR	LC	F	C	REP	PRWT	WO	0.160	0.4	N	0.0325	N	0.00411	202	506	10	10	5	5	5	10	10	10	10	4	79
150	2758	Maker et al., 1973	Lead carbonate	100	Mouse (*Mus musculus*)	7	0/0.08/0.16/0.4/0.5/1.0/2.0	% in diet	N		NR	U	FD	30	d	NR	NR	LC	F	C	REP	PRWT	WO	0.160	0.4	N	0.0325	N	0.00411	202	506	10	10	5	5	5	10	10	10	10	4	79
151	14816	Cramer et al, 1980	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/2.5/5.0/10	mg/g	N		ADL	U	DR	21	d	NR	NR	GE	F	C	REP	DEYO	WO	2.5	5.0	N	0.338	N	0.0373	276	552	10	5	5	5	5	10	10	10	10	4	74
152	2785	Nathan et al., 1992	Lead acetate	54.61	Rat (*Rattus norvegicus*)	5	0/0.05/0.1/0.5/1	% in water	N		ADL	U	DR	10	w	NR	NR	AD	M	C	REP	TEWT	MT	0.500	1.00	Y	0.439	N	0.04719	294	587	10	5	5	5	6	10	10	10	6	4	71
153	14795	Brady, et al, 1975	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/240	mg/org	N		DLY	U	GV	102	d	30	d	GE	F	C	REP	PRWT	WO	240		N	0.297	N	0.02533	441		10	8	10	5	7	10	4	1	10	4	69
154	2928	Wenda-Rozewicka et al., 1996	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/10000	mg/L	N		ADL	U	DR	9	mo	NR	NR	SM	M	C	REP	RHIS	TE	10000		N	0.35	N	0.03849	600		10	5	5	5	5	10	4	8	10	4	66

Appendix 6.1 Mammalian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
Lead

Ref			Exposure																				Effects					Conversion to mg/kg bw/day				Result		Data Evaluation Score											
Result #	Ref N.		Chemical Form	MW%	Test Species	# of Conc/ Doses	Conc/ Doses	Conc/Dose Units	Wet Weight Reported?	Percent Moisture	Application Frequency	Method of Analyses	Route of Exposure	Exposure Duration	Duration Units	Age	Age Units	Lifestage	Sex	Control Type	Effect Type	Effect Measure	Response Site	Study NOAEL	Study LOAEL	Body Weight Reported?	Body Weight in kg	Ingestion Rate Reported?	Ingestion Rate in kg or L/day	NOAEL Dose (mg/kg/day)	LOAEL Dose (mg/kg/day)	Data Source	Dose Route	Test Concentrations	Chemical form	Dose Quantification	Endpoint	Dose Range	Statistical Power	Exposure Duration	Test Conditions	Total
155	10239	Barrett and Livesey, 1983	Lead	100	Rat (*Rattus norvegicus*)	4	0/0.2/0.4/1.0	% in diet	N		DLY	U	FD	4	d	NR	NR	LC	F	C	REP	PRWT	WO	0.400	1.00	Y	0.311	Y	0.04675	601	1500	10	10	5	10	7	10	10	10	4	86
156	2817	Piasekand Kostial, 1987	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/216/420/639.36	mg/kg bw/d	N		ADL	U	DR	13	w	NR	NR	JV	M	C	REP	FERT	WO	639		N	0.25	Y	0.04	639		10	5	5	5	10	10	4	3	10	4	66
157	2725	Junaid et al., 1997	Lead acetate	100	Mouse (*Mus musculus*)	4	0/2/4/8	mg/kg bw/d	N		5 per w	U	GV	60	d	NR	NR	AD	F	V	REP	RPRD	OV		2.00	Y	0.025	N	0.00331		2.00	10	8	10	5	10	10	4	10	6	4	77
158	15125	Morris et al, 1938	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/1269/9307.8	ug/org/d	N		ADL	U	FD	339	d	26-27	d	JV	B	C	REP	PRWT	WO		1269	Y	0.509	N	0.03943		2.49	10	10	5	5	6	10	4	10	10	4	74
159	66	Schroeder and Mitchener, 1971	Lead	100	Rat (*Rattus norvegicus*)	2	0/25	ppm in mg/L	N		ADL	U	DR	9	mo	21	d	JV	F	C	REP	DEYO	WO		25.0	N	0.179	N	0.02105		2.94	10	5	5	4	5	10	4	10	10	4	67
160	66	Schroeder and Mitchener, 1971	Lead	100	Mouse (*Mus musculus*)	2	0/25	mg/L	N		ADL	U	DR	6	mo	21	d	JV	F	C	REP	DEYO	WO		25.0	N	0.0225	N	0.00326		3.62	10	5	5	4	5	10	4	10	10	4	67
161	2666	Gupta et al., 1995	Lead acetate	54.61	Mouse (*Mus musculus*)	4	0/10/25/50	mg/kg bw	N		DLY	U	GV	52	d	2	mo	GE	F	C	REP	PROG	EM		10.0	Y	0.025	N	0.00331		5.46	10	8	10	5	10	10	4	10	10	4	81
162	2857	Saxena et. al. 1989	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/1.920	mg/org/d	N		ADL	U	DR	120	d	1	d	GE	M	C	REP	SPCL	TE		1.92	Y	0.284	N	0.03189		6.76	10	5	5	5	6	10	4	10	10	4	69
163	2568	Cernochova and Kamarad, 1992	Lead dinitrate	100	Mouse (*Mus musculus*)	2	0/21.75	mg/org	N		ADL	U	DR	5	w	NR	NR	AD	M	C	REP	TEDG	TE		0.614	N	0.0375	N	0.00516		16.6	10	5	5	10	5	10	4	10	3	4	66
164	20974	Al-Omar et al, 2000	Lead oxide	92.83	Mouse (*Mus musculus*)	2	0/50	mg/kg bw/d	N		DLY	M	GV	2	w	NR	NR	JV	M	V	REP	SPCL	SM		50.0	Y	0.02343	N	0.00314		46.4	10	8	10	10	10	10	4	10	10	4	86
165	3935	Winneke et al., 1977	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/49.6	mg/kg bw/d	N		NR	U	FD	102	d	NR	NR	GE	F	C	REP	PROG	WO		49.6	Y	0.35	N	0.02899		49.6	10	10	5	5	10	10	4	10	10	4	78
166	2528	Batra et al., 1998	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/50	mg/kg bw/d	N		DLY	U	GV	3	mo	8	w	SM	M	C	REP	TEDG	TE		50.0	Y	0.15	N	0.01444		50.0	10	8	10	5	10	10	4	10	10	4	81
167	3864	Hayashi, 1983	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/500	mg/L	N		ADL	U	DR	18	d	NR	NR	GE	F	C	REP	PRWT	WO		500	N	0.32	N	0.0355		55.5	10	5	5	5	5	10	4	10	10	4	68
168	2733	Kempinas et. al 1988	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/0.5/1.0	g/L	N		ADL	U	DR	90	d	NR	NR	AD	M	C	REP	SPCL	SM		0.500	Y	0.12	N	0.01469		61.2	10	5	5	5	6	10	4	10	10	4	69
169	2598	Donald et al., 1981	Lead acetate	54.61	Mouse (*Mus musculus*)	2	0/0.13	% in water	N		DLY	U	DR	23	d	NR	NR	GE	F	C	REP	PRWT	WO		0.130	Y	0.325	N	0.0360		78.6	10	5	5	5	6	10	4	10	10	4	69
170	2599	Donald et al., 1986	Lead acetate	54.61	Mouse (*Mus musculus*)	2	0/0.13	% in water	N		DLY	U	DR	62	d	NR	NR	GE	F	C	REP	PRWT	WO		0.130	Y	0.03	N	0.00422		99.8	10	5	5	5	6	10	4	10	10	4	69
171	2906	Talcott and Koller, 1983	Lead acetate	100	Mouse (*Mus musculus*)	2	0/1000	mg/L	N		NR	U	DR	18	w	6-8	w	LC	F	C	REP	PRWT	WO		1000	Y	0.03755	N	0.00516		137	10	5	5	5	6	10	4	10	10	4	69
172	2723	Johansson and Wide, 1986	Lead chloride	100	Mouse (*Mus musculus*)	2	0/1	g/L	N		ADL	U	DR	12	w	9	w	SM	M	C	REP	PRFM	WO		1.00	Y	0.0334	N	0.00465		139	10	5	5	10	6	10	4	10	10	4	74
173	2713	Jacquet et al., 1997	Lead	100	Mouse (*Mus musculus*)	4	0/0.125/0.25/0.5	% in diet	N		NR	U	FD	18	d	NR	NR	GE	F	C	REP	PRWT	WO		0.125	N	0.0375	N	0.00462		154	10	10	5	4	5	10	4	10	10	4	72
174	2502	Wolfe et al, 1996	Lead acetate trihydrate	100	Rat (*Rattus norvegicus*)	2	0/171.27	mg/kg bw/d	N		ADL	M	DR	4	w	99	d	JV	M	C	REP	SPCL	SM		171	Y	0.51751	Y	0.02276		171	10	5	10	5	10	10	4	10	10	4	78
175	14750	Blanusa, et al, 1989	Lead acetate	100	Rat (*Rattus norvegicus*)	5	0/1500/3500/5500/7500	mg/L	N		NR	U	DR	6	w	4	mo	GE	F	C	REP	RHIS	WO		1500	Y	0.19	N	0.02221		175	10	5	5	5	6	10	4	10	10	4	69
176	14816	Cramer et al, 1980	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/60	mg/org/d	N		ADL	U	DR	22	d	NR	NR	GE	F	C	REP	PRWT	WO		60.0	N	0.338	N	0.0373		178	10	5	5	5	5	10	4	10	10	4	69
177	2888	Sokol et al., 1985	Lead acetate	54.61	Rat (*Rattus norvegicus*)	3	0/0.1/0.3	% water	N		ADL	U	DR	30	d	52	d	JV	M	C	REP	GREP	PY		0.100	Y	0.37188	Y	0.135		198	10	5	5	5	7	10	4	10	10	4	70
178	2669	Hallen et al., 1995	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg bw	N		NR	U	DR	13	w	NR	NR	GE	F	C	REP	PRWT	WO		200	Y	0.2	N	0.02326		200	10	5	5	5	10	10	4	10	10	4	73
179	13216	Rabe et al., 1985	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/0.5	% in water	N		ADL	U	DR	21	d	80	d	JV	F	C	REP	PRWT	WO		0.500	Y	0.351	Y	0.02808		218	10	5	5	5	7	10	4	10	10	4	70
180	2783	Mykkanen et al., 1980	Lead acetate	54.61	Rat (*Rattus norvegicus*)	4	0/1/2	% in diet	N		ADL	U	FD	3	w	NR	NR	LC	F	C	REP	PRWT	WO		0.500	N	0.4	N	0.03235		221	10	10	5	5	5	10	4	10	10	4	73
181	2704	Hsu, 1980	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/0.5	% in diet	N		ADL	U	FD	1	w	19	w	LC	F	C	REP	PRWT	WO		0.500	N	0.3846	N	0.03132		222	10	10	5	5	5	10	4	10	10	4	73
182	2783	Mykkanen et al., 1980	Lead acetate	54.61	Rat (*Rattus norvegicus*)	4	0/0.5/1/2	% in diet	N		ADL	U	FD	3	w	NR	NR	LC	F	C	REP	PRWT	WO		0.500	N	0.32	N	0.02693		230	10	10	5	5	5	10	4	10	10	4	73
183	2511	Alfano and Petit, 1982	Lead carbonate	77.55	Rat (*Rattus norvegicus*)	3	0/0.4/4.0	% in diet	N		ADL	U	FD	25	d	NR	NR	LC	F	C	REP	PRWT	WO		0.400	N	0.344	N	0.0286		258	10	10	5	10	5	10	4	10	10	4	78
184	3939	Yu et al, 1996	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/0.3	% in water	N		DLY	U	DR	21	d	NR	NR	LC	F	C	REP	PRWT	WO		0.300	N	0.35	N	0.03849		330	10	5	5	5	5	10	4	10	10	4	68
185	2887	Sokol, 1989	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/6000	mg/L	N		ADL	U	DR	30	d	52	d	JV	M	C	REP	SPCL	SM		6000	Y	0.412	N	0.04457		354	10	5	5	5	6	10	4	10	10	4	69
186	2845	Ronis et al., 1998	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/6000	mg/L	N		ADL	U	DR	17	d	NR	NR	GE	F	M	REP	PRWT	WO		6000	N	0.35	N	0.03849		360	10	5	5	5	5	10	4	10	10	4	68
187	2845	Ronis et al., 1998	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/6000	mg/L	N		ADL	U	DR	24	d	NR	NR	LC	F	M	REP	PRWT	WO		6000	N	0.35	N	0.03849		360	10	5	5	5	5	10	4	10	10	4	68
188	2846	Ronis et al., 1996	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/6000	mg/L	N		ADL	U	DR	12	d	NR	NR	GE	F	C	REP	PRWT	WO		6000	Y	0.338	N	0.0373		362	10	5	5	5	6	10	4	10	10	4	69
189	2887	Sokol, 1989	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/6000	mg/L	N		ADL	U	DR	30	d	27	d	JV	M	C	REP	SPCL	SM		6000	Y	0.32	N	0.0355		364	10	5	5	5	6	10	4	10	10	4	69
190	2821	Pinon-Lataillade et al., 1995	Lead acetate	54.61	Mouse (*Mus musculus*)	2	0/0.5	% in water	N		ADL	U	DR	44	d	NR	NR	GE	F	C	REP	PRWT	WO		0.500	N	0.0325	N	0.00453		381	10	5	5	5	5	10	4	10	10	4	68
191	3719	Draski et al., 1989	Lead acetate	54.61	Mouse (*Mus musculus*)	2	0/0.5	% in water	N		ADL	U	DR	14	d	NR	NR	LC	F	C	REP	PRWT	WO		0.500	N	0.0325	N	0.00453		381	10	5	5	5	5	10	4	10	10	4	68
192	2846	Ronis et al., 1996	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/6000	mg/L	N		ADL	U	DR	50	d	24	d	JV	F	C	REP	RBEH	WO		6000	Y	0.2	N	0.02326		381	10	5	5	5	6	10	4	10	10	4	69
193	2836	Rasile et. al. 1995	Lead acetate	54.61	Mouse (*Mus musculus*)	2	0/0.5	% in water	N		ADL	U	DR	45	d	50-100	d	GE	F	C	REP	ODVP	WO		0.500	Y	0.018	N	0.00266		404	10	5	5	5	6	10	4	10	10	4	69
194	2909	Thoreux-Manlay et al., 1995	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/7	g/L	N		ADL	U	DR	22	d	NR	NR	GE	F	C	REP	PRWT	WO		7.00	N	0.35	N	0.03849		420	10	5	5	5	5	10	4	10	10	4	68
195	2597	Donald et al., 1987	Lead acetate	54.61	Mouse (*Mus musculus*)	2	0/0.25	% in water	N		ADL	U	DR	48	d	NR	NR	GE	F	C	REP	PRWT	WO		0.250	Y	0.035	Y	0.0112		437	10	5	5	5	7	10	4	10	10	4	70
196	2760	Marchlewicz et al., 1993	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/1	% in water	N		ADL	U	DR	9	mo	3	mo	SM	M	M	REP	SPCL	TE		1.00	Y	0.5	N	0.05305		579	10	5	5	5	6	10	4	10	10	4	69
197	2816	Piasecka et. al. 1995	Lead acetate trihydrate	54.61	Rat (*Rattus norvegicus*)	2	0/1	% in water	N		ADL	U	DR	9	mo	NR	NR	SM	M	C	REP	TEDG	TE		1.00	Y	0.35	N	0.03849		600	10	5	5	5	6	10	4	10	10	4	69
198	14751	Piasek et al, 1988	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/5500	mg/L	N		ADL	U	DR	3	w	14	w	LC	F	C	REP	PRWT	WO		5500	Y	0.2137	N	0.02469		635	10	5	5	5	6	10	4	10	10	4	69
199	2711	Jacquet, 1977	Lead acetate	100	Mouse (*Mus musculus*)	2	0/0.5	% in diet	N		DLY	U	FD	7	d	NR	NR	GE	F	C	REP	RSUC	EM		0.500	N	0.02875	N	0.00371		646	10	10	5	5	5	10	4	10	10	4	73
200	2869	Selvin-Testa et. al. 1997	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/1	% in water	N		ADL	U	DR	126	d	1	d	GE	F	C	REP	PROG	WO		1.00	N	0.156	N	0.0186		651	10	5	5	5	5	10	4	8	10	4	66
201	2818	Piasek and Kostial 1991	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/750	mg/kg bw/d	N		NR	U	DR	20	w	10	w	GE	F	C	REP	PRWT	WO		750	Y	0.2681	N	0.03028		750	10	5	5	5	10	10	4	10	10	4	73
202	2614	Epstein, et.al. 1991	Lead acetate	54.61	Mouse (*Mus musculus*)	2	0/10	mg/ml	N		NR	U	DR	4	d	NR	NR	LC	F	C	REP	PRWT	WO		10.0	N	0.0325	N	0.00453		762	10	5	5	5	5	10	4	10	10	4	68
203	2698	Holtzman et al., 1981	Lead carbonate	77.55	Rat (*Rattus norvegicus*)	2	0/1	% in diet	N		ADL	U	FD	2	w	NR	NR	LC	F	C	REP	PRWT	WO		1.00	N	0.35	N	0.02899		828	10	10	5	10	5	10	4	10	10	4	78
204	2699	Holtzman et al, 1978	Lead carbonate	100	Rat (*Rattus norvegicus*)	2	0/1	% in diet	N		ADL	U	FD	7	d	NR	NR	LC	F	C	REP	PRWT	WO		1.00	N	0.338	N	0.02817		833	10	10	5	10	5	10	4	10	10	4	78
205	2523	Barlow et al., 1977	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/2	% in diet	N		ADL	U	FD	21	d	NR	NR	LC	F	C	REP	PRWT	WO		2.00	Y	0.21	N	0.01905		991	10	10	5	5	6	10	4	10	10	4	74
206	2837	Gulati et al, 1985	Lead acetate trihydrate	100	Mouse (*Mus musculus*)	4	0/4.98/10.055/20.52	mg/ml	Y		ADL	M	DR	18	w	11	w	JV	F	C	REP	PRWT	WO		4.84	Y	0.0422	Y	0.0113		1370	10	5	10	5	7	10	4	10	10	4	75
207	2767	McConnell and Berry, 1979	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/4	% in diet	N		ADL	U	FD	30	d	NR	NR	LC	F	C	REP	PRWT	WO		4.00	N	0.4	N	0.03235		1770	10	10	5	5	5	10	4	10	10	4	73

Appendix 6.1 Mammalian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
Lead

Ref			Exposure																					Effects					Conversion to mg/kg bw/day				Result		Data Evaluation Score											
Result #	Ref N.		Chemical Form	MW%	Test Species	# of Conc/ Doses	Conc/ Doses	Conc/Dose Units	Wet Weight Reported?	Percent Moisture	Application Frequency	Method of Analyses	Route of Exposure	Exposure Duration	Duration Units	Age	Age Units	Lifestage	Sex	Control Type	Effect Type	Effect Measure	Response Site	Study NOAEL	Study LOAEL	Body Weight Reported?	Body Weight in kg	Ingestion Rate Reported?	Ingestion Rate in kg or L/day	NOAEL Dose (mg/kg/day)	LOAEL Dose (mg/kg/day)	Data Source	Dose Route	Test Concentrations	Chemical form	Dose Quantification	Endpoint	Dose Range	Statistical Power	Exposure Duration	Test Conditions	Total
208	2871	Sharma and Kanwar, 1985	Lead acetate	100	Mouse (*Mus musculus*)	2	0/61.6	mg/org	N		NR	U	DR	14	w	NR	NR	GE	B	C	REP	PROG	WO		61.6	Y	0.031	Y	0.007		1990	10	5	5	5	7	10	4	10	10	4	70
209	14824	Goldstein et al, 1974	Lead carbonate	77.55	Rat (*Rattus norvegicus*)	2	0/4	% in diet	N		ADL	U	FD	16	d	NR	NR	LC	F	C	REP	PROG	WO		4.00	N	0.35	N	0.02899		2570	10	10	5	10	5	10	4	10	10	4	78
210	14827	Holtzman et al, 1980	Lead carbonate	77.55	Rat (*Rattus norvegicus*)	2	0/4	% in diet	N		ADL	U	FD	7	d	NR	NR	LC	F	C	REP	PRWT	WO		4.00	N	0.35	N	0.02899		2570	10	10	5	10	5	10	4	10	10	4	78
211	2741	Krigman et al., 1974	Lead carbonate	77.55	Rat (*Rattus norvegicus*)	2	0/4	% in diet	N		ADL	U	FD	25	d	NR	NR	LC	F	C	REP	PRWT	WO		4.00	N	0.35	N	0.02899		2570	10	10	5	10	5	10	4	10	10	4	78
212	2811	Pentschew and Garro 1966	Lead carbonate	77.55	Rat (*Rattus norvegicus*)	2	0/4.0	% in diet	NR		NR	M	FD	27	d	NR	NR	LC	F	C	REP	PROG	WO		4.5	N	0.248	N	0.02184		2840	10	10	10	5	5	10	4	10	10	4	78
213	2871	Sharma and Kanwar, 1985	Lead acetate	100	Mouse (*Mus musculus*)	2	0/58	mg/org	N		NR	U	DR	14	w	21	d	JV	B	C	REP	PROG	WO		58.0	Y	0.016	Y	0.00041		3630	10	5	5	5	7	10	4	10	10	4	70
214	2774	Michaelson and Sauerhoff, 1974	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/5	% in diet	N		ADL	U	FD	17	d	NR	NR	LC	F	C	REP	PRWT	WO		5.00	N	0.35	N	0.0432		6170	10	10	5	5	6	10	4	10	10	4	74
Growth																																														
215	14386	Willoughby et al., 1972	Lead carbonate	100	Horse (*Equus caballus*)	2	0/30	mg/kg diet	N		DLY	U	FD	15	w	20 to 21	w	JV	M	C	GRO	BDWT	WO	30.0		N	181.44	Y	1.151	0.150		10	10	5	10	6	8	4	1	10	4	68
216	2634	Fox et.al., 1982	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/0.5	ug/g bw/d	N		ADL	U	FD	21	d	0	d	JV	F	C	GRO	BDWT	WO	0.500		N	0.179	N	0.0167	0.500		10	10	5	5	10	8	4	1	10	4	67
217	2593	Dilts and Ahokas, 1979	Lead acetate	100	Rat (*Rattus norvegicus*)	6	0/10/50/100/200/500	mg/L	N		ADL	U	DR	21	d	NR	NR	GE	F	C	GRO	BDWT	WO	10.0	50.0	Y	0.370	Y	0.037	1.00	5.00	10	5	5	5	7	8	8	10	10	4	72
218	2737	Kimmel et al., 1980	Lead acetate	100	Rat (*Rattus norvegicus*)	5	0/0.13/1.27/13/69	mg/kg bw/d	N		ADL	U	DR	7	d	50	d	AD	F	V	GRO	BDWT	WO	1.27	13	Y	0.325	N	0.036	1.27	13.0	10	5	5	5	10	8	6	10	10	4	73
219	14380	Lynch et al, 1975	Lead carbonate	77.55	Cattle (*Bos taurus*)	4	0/0.64/1.28/2.57	mg/kg bw/d	N		3 per w	U	OR	7	w	1	w	JV	M	C	GRO	BDWT	WO	2.57		Y	61	N	2.01603	1.99		10	8	10	10	10	8	4	1	10	4	75
220	2930	Wiebe and Barr, 1988	Lead chloride	100	Rat (*Rattus norvegicus*)	3	0/20/200	mg/kg	N		NR	U	DR	14	d	21	d	JV	F	C	GRO	BDWT	WO	20.0		Y	0.1228	N	0.0150	2.40		10	5	5	10	6	8	4	10	10	4	72
221	14446	Schroeder et al, 1963	Lead	100	Rat (*Rattus norvegicus*)	2	0/25	mg/L	N		DLY	U	DR	332	d	28	d	JV	B	C	GRO	BDWT	WO	25.0		Y	0.1575	N	0.01876	2.98		10	5	5	4	6	8	4	10	10	4	66
222	2737	Kimmel et al., 1980	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/0.92/4.7/8.9	mg/kg bw/d	N		ADL	U	DR	7	w	21	d	GE	F	V	GRO	BDWT	WO	4.70	8.90	Y	0.3	N	0.0335	4.70	8.90	10	5	5	5	10	8	10	10	10	7	80
223	3873	Horwitt and Cowgill, 1937	Lead acetate	100	Dog (*Canis familiaris*)	3	0/27/102	mg/kg diet	N		DLY	M	FD	7	mo	NR	NR	JV	NR	C	GRO	BDWT	WO	102		Y	9.3	N	0.42959	4.71		10	10	10	5	6	8	4	1	10	4	68
224	2944	Zheng et al., 1996	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/50/250	mg/L	N		ADL	U	DR	30	d	22-24	d	JV	M	C	GRO	BDWT	WO	50.0	250	Y	0.27	N	0.0305	5.64	28.2	10	5	5	5	6	8	8	10	10	4	71
225	2675	Hammond et al., 1989	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/50/250/500	mg/L	N		ADL	U	DR	23	d	22	d	JV	F	C	GRO	BDWT	WO	50.0	250	N	0.204	N	0.02368	5.80	29.0	10	5	5	5	5	8	8	10	10	7	73
226	3711	Lynch et al., 1976	Lead carbonate	100	Cattle (*Bos taurus*)	3	0/4.16/7.79	mg/kg bw/d	N		3 per w	U	OR	84	d	NR	NR	JV	M	C	GRO	BDWT	WO	7.79		Y	80.2	Y	0.157	7.79		10	8	10	10	10	8	4	6	10	4	80
227	2830	Rader et al., 1981	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/9.1	mg/kg bw/d	N		1 per w	U	OR	6	w	NR	NR	AD	M	C	GRO	BDWT	WO	9.10		Y	0.475	N	0.03726	9.10		10	8	5	5	10	8	4	10	3	4	67
228	2788	Nehru et al., 1997	Lead	100	Rat (*Rattus norvegicus*)	2	0/20	mg/kg bw	N		EOD	U	GV	8	w	NR	NR	JV	F	C	GRO	BDWT	WO	10.0		Y	0.18125	N	0.01688	10.0		10	8	10	4	10	8	4	10	10	4	78
229	2660	Gruber et al., 1997	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/100/5000	mg/L	N		DLY	U	DR	6	mo	NR	NR	AD	M	C	GRO	BDWT	WO	100	5000	Y	0.483	N	0.05143	10.6	532	10	5	5	5	6	8	6	10	10	4	69
230	2751	Lorenzo et al., 1978	Lead nitrate	62.56	Rabbit (*Oryctolagus cuniculus*)	3	0/10.7/50.4	mg/kg bw/d	N		DLY	U	GV	10	d	1	d	JV	F	C	GRO	BDWT	WO	10.7	50.44	N	1	N	0.0687	10.7	50.4	10	8	5	10	5	8	8	10	10	4	78
231	21143	El-Gazzar et al, 1978	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/100	mg/L	N		NR	U	DR	140	d	21	d	JV	M	C	GRO	BDWT	WO	100		Y	0.443	N	0.04758	10.7		10	5	5	5	6	8	4	10	10	4	67
232	2830	Rader et al., 1981	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/15.1	mg/kg bw/d	N		ADL	U	DR	6	w	NR	NR	JV	M	C	GRO	BDWT	WO	15.1		Y	0.337	N	0.0372	15.1		10	5	5	5	10	8	4	10	10	4	71
233	14580	Mahaffey et al., 1977	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg diet	N		ADL	UX	FD	10	w	NR	NR	JV	M	C	GRO	BDWT	WO	200		N	0.523	N	0.04032	15.4		10	10	10	5	5	8	4	10	10	7	79
234	2830	Rader et al., 1981	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/15.54	mg/kg bw/d	N		1 per w	U	OR	6	w	NR	NR	AD	M	C	GRO	BDWT	WO	15.5		Y	0.475	N	0.03726	15.5		10	8	5	5	10	8	4	10	10	4	74
235	2829	Rader et. al. 1981	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/16.1	mg/kg bw/d	N		NR	U	DR	7	w	NR	NR	JV	M	C	GRO	BDWT	WO	16.1		Y	0.341	N	0.03759	16.1		10	5	5	5	10	8	4	10	10	4	71
236	14822	Gerber et al, 1978	Lead acetate	100	Mouse (*Mus musculus*)	3	0/0.1/1.0	mg/ml	N		NR	U	DR	14	d	0	d	JV	NR	C	GRO	BDWT	WO	0.100	1.00	Y	0.00692	N	0.0011	16.3	163	10	5	5	5	6	8	8	10	10	4	71
237	2524	Barratt et al., 1989	Lead acetate	54.61	Rat (*Rattus norvegicus*)	4	0/0.3/33/300	mg/kg bw	N		DLY	U	GV	9	w	10	w	JV	M	C	GRO	BDWT	WO	33.0	330	N	0.217	N	0.01957	18.0	180	10	8	10	5	10	8	8	10	10	4	83
238	15125	Morris et al, 1938	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/1269/9307.8	ug/org/d	N		ADL	U	FD	339	d	26-27	d	JV	B	C	GRO	BDWT	WO	9308		Y	0.509	N	0.03943	18.3		10	10	5	5	6	8	4	10	10	4	72
239	2905	Tafelski and Lamperti, 1975	Lead acetate	54.61	Rat (*Rattus norvegicus*)	4	0/1/5/10	mg/org	N		DLY	U	GV	29	d	NR	NR	SM	F	C	GRO	BDWT	WO	10.0		Y	0.289	N	0.02476	18.9		10	8	10	5	6	8	4	10	6	4	71
240	2756	Mahaffey et al., 1973	Lead acetate	100	Rat (*Rattus norvegicus*)	7	0/0.19/0.70/2.8/5.9/12.9/24.3	mg/kg bw/d	N		NR	U	DR	10	w	NR	NR	JV	M	C	GRO	BDWT	WO	24.3		Y	0.31	N	0.0345	24.3		10	5	5	5	10	8	4	10	10	4	71
241	14812	Bull, et.. al., 1978	Lead chloride	100	Rat (*Rattus norvegicus*)	4	0/0.8/4.0/32.5	mg/kg bw/d	N		ADL	U	DR	56	d	70	d	LC	F	C	GRO	BDWT	WO	32.5		N	0.2024	N	0.02351	32.5		10	5	5	10	10	8	4	1	10	4	67
242	3704	Fick et al., 1976	Lead acetate	100	Sheep (*Ovis aries*)	5	0/10/100/500/1000	mg/kg diet	N		DLY	U	FD	84	d	NR	NR	JV	M	C	GRO	BDWT	WO	1000		Y	37	Y	1.21	32.7		10	10	5	5	7	8	4	3	10	4	66
243	14852	Bankowska and Hine, 1985	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/350	mg/L	N		ADL	U	DR	10	w	NR	NR	JV	M	C	GRO	BDWT	WO	350		Y	0.352	N	0.03868	38.5		10	5	5	5	6	8	4	10	10	4	67
244	3889	Logner et al., 1984	Lead sulfate	100	Cattle (*Bos taurus*)	4	0/16/43/305	mg/kg bw/d	N		DLY	U	FD	7	w	16	w	JV	M	C	GRO	BDWT	WO	43.0		Y	137.43	Y	3.64	43.0		10	10	5	10	10	8	4	1	10	4	72
245	2507	Agodi et al., 1990	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/50	mg/kg bw	N		DLY	U	GV	28	d	2	d	JV	B	V	GRO	BDWT	WO	50.0		Y	0.0531	N	0.00615	50.0		10	8	10	5	10	8	4	10	10	4	79
246	2502	Wolfe et al, 1996	Lead acetate trihydrate	100	Rat (*Rattus norvegicus*)	5	0/18.9/38.21/71.5/178.4	mg/kg bw/d	N		ADL	M	DR	4	w	94	d	JV	M	C	GRO	BDWT	WO	71.5	178	Y	0.48933	Y	0.02792	71.5	178	10	5	10	5	10	8	10	10	10	4	82
247	14821	Gelman and Michaelson, 1979	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/25/75/225	mg/kg bw/d	N		1 per d	U	GV	12	d	2	d	JV	B	C	GRO	BDWT	WO	75.0	225	Y	0.3	N	0.02554	75.0	225	10	8	10	5	10	8	10	10	10	4	85
248	2806	Rudra Pal et al., 1975	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/100	mg/kg bw/d	N		NR	U	FD	4	w	NR	NR	JV	M	C	GRO	BDWT	WO	100		Y	0.11	N	0.01119	100		10	10	5	5	10	8	4	1	10	4	67
249	14799	Goyer et al., 1970	Lead acetate	100	Rat (*Rattus norvegicus*)	6	0/2.3/7.0/12/21/67/220	mg/org/d	N		NR	U	DR	10	w	NR	NR	JV	M	C	GRO	BDWT	WO	21.0	67.0	Y	0.175	N	0.02062	120	383	10	5	5	5	6	8	8	10	10	4	71
250	2618	Eyden et al, 1978	Lead acetate	100	Mouse (*Mus musculus*)	3	0/0.1/1.0	% in diet	N		ADL	U	FD	4	w	3	mo	JV	B	C	GRO	BDWT	WO	0.100	1.00	Y	0.0220	N	0.00298	136	1360	10	10	5	5	6	8	8	10	10	4	76
251	2906	Talcott and Koller, 1983	Lead acetate	100	Mouse (*Mus musculus*)	2	0/1000	mg/L	N		NR	U	DR	18	w	6-8	w	LC	F	C	GRO	BDWT	WO	1000		Y	0.03755	N	0.00516	137		10	5	5	5	6	8	4	10	10	4	67
252	2723	Johansson and Wide, 1986	Lead chloride	100	Mouse (*Mus musculus*)	2	0/1	g/L	N		ADL	U	DR	12	w	NR	NR	GE	M	C	GRO	BDWT	WO	1.00		Y	0.0334	N	0.00465	139		10	5	5	10	6	8	4	10	10	4	72
253	2888	Sokol et al., 1985	Lead acetate	54.61	Rat (*Rattus norvegicus*)	3	0/0.1/0.3	% water	N		ADL	U	DR	30	d	52	d	JV	M	C	GRO	BDWT	WO	0.100	0.300	Y	0.33188	Y	0.103	169	508	10	5	5	5	7	8	10	10	10	4	74
254	2502	Wolfe et al, 1996	Lead acetate trihydrate	100	Rat (*Rattus norvegicus*)	2	0/171.27	mg/kg bw/d	N		ADL	M	DR	4	w	99	d	JV	M	C	GRO	BDWT	WO	171		Y	0.51751	Y	0.02276	171		10	5	10	5	10	8	4	10	10	4	76
255	12025	Kishi et al., 1983	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/45/90/180	mg/kg bw	N		DLY	U	GV	18	d	3	d	JV	M	C	GRO	BDWT	WO	180		Y	0.0503	N	0.00588	180		10	8	10	5	10	8	4	10	10	4	79
256	2924	Wadi and Ahmad, 1999	Lead acetate	54.61	Mouse (*Mus musculus*)	3	0/0.25/0.5	% in water	N		ADL	U	DR	6	w	7	w	SM	M	C	GRO	BDWT	WO	0.250	0.500	Y	0.0398	N	0.00544	187	373	10	5	5	5	6	8	10	10	6	4	69
257	2815	Petrusz et al., 1979	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/25/100/200	mg/kg bw/d	N		DLY	U	GV	18	d	2	d	JV	B	C	GRO	BDWT	WO	200		N	0.035	N	0.00437	200		10	8	10	5	10	8	4	1	10	4	70
258	3937	Yagminas et al., 1990	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg bw/d	N		5 per w	U	GV	91	d	NR	NR	JV	M	C	GRO	BDWT	WO	200		Y	0.454	N	0.0359	200		10	8	10	5	10	8	4	10	10	4	79
259	13216	Rabe et al., 1985	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/0.5	% in water	N		ADL	U	DR	21	d	80	d	JV	F	C	GRO	BDWT	WO	0.500		Y	0.351	Y	0.02808	218		10	5	5	5	7	8	4	10	10	4	68

Ref			Exposure																				Effects					Conversion to mg/kg bw/day				Result		Data Evaluation Score											
Result #	Ref N.		Chemical Form	MW%	Test Species	# of Conc/ Doses	Conc/ Doses	Conc/Dose Units	Wet Weight Reported?	Percent Moisture	Application Frequency	Method of Analyses	Route of Exposure	Exposure Duration	Duration Units	Age	Age Units	Lifestage	Sex	Control Type	Effect Type	Effect Measure	Response Site	Study NOAEL	Study LOAEL	Body Weight Reported?	Body Weight in kg	Ingestion Rate Reported?	Ingestion Rate in kg or L/day	NOAEL Dose (mg/kg/day)	LOAEL Dose (mg/kg/day)	Data Source	Dose Route	Test Concentrations	Chemical form	Dose Quantification	Endpoint	Dose Range	Statistical Power	Exposure Duration	Test Conditions	Total
260	2783	Mykkanen et al., 1980	Lead acetate	54.61	Rat (*Rattus norvegicus*)	4	0/0.5/1/2	% in diet	N		ADL	U	FD	1	w	NR	NR	LC	F	C	GRO	BDWT	WO	0.500	1.00	N	0.32	N	0.02693	230	460	10	10	5	5	5	8	10	10	10	4	77
261	2889	Sourgens et al., 1987	Lead acetate trihydrate	54.61	Rat (*Rattus norvegicus*)	4	0/45/900/4580	mg/L	N		ADL	U	DR	30	d	NR	NR	JV	M	C	GRO	BDWT	WO	4580		Y	0.246	N	0.02802	285		10	5	5	5	6	8	4	10	10	4	67
262	3847	Exon et al., 1979	Lead acetate	100	Mouse (*Mus musculus*)	5	0/13/130/1300/2600	mg/L	N		ADL	U	DR	10	w	NR	NR	JV	M	C	GRO	BDWT	WO	2600		Y	0.0334	N	0.00465	362		10	5	5	5	6	8	4	10	10	4	67
263	2887	Sokol, 1989	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/6000	mg/L	N		ADL	U	DR	30	d	52	d	JV	M	C	GRO	BDWT	WO	6000		Y	0.32	N	0.0355	364		10	5	5	5	6	8	4	10	10	4	67
264	2697	Holtzman et al., 1982	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/400/800/1600	mg/kg bw/d	N		DLY	U	GV	14	d	14	d	JV	NR	C	GRO	BDWT	WO	400	800	N	0.267	N	0.0232	400	800	10	8	10	5	10	8	10	10	10	4	85
265	2697	Holtzman et al., 1982	Lead acetate	100	Rat (*Rattus norvegicus*)	5	0/400/800/1600/2400	mg/kg bw/d	N		DLY	U	GV	14	d	20	d	JV	NR	C	GRO	BDWT	WO	400	800	N	0.267	N	0.0232	400	800	10	8	10	5	10	8	10	10	10	4	85
266	14822	Gerber et al, 1978	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/0.5	% in diet	N		NR	U	FD	14	mo	0	d	JV	NR	C	GRO	BDWT	WO	0.500		Y	0.278	N	0.0240	431		10	10	5	5	6	8	4	8	10	4	70
267	14795	Brady, et al, 1975	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/240	mg/org	N		DLY	U	GV	102	d	30	d	LC	F	C	GRO	BDWT	WO	240		N	0.297	N	0.02533	441		10	8	10	5	7	8	4	1	10	4	67
268	2896	Stewart et al., 1998	Lead acetate	54.61	Mouse (*Mus musculus*)	4	0/193/390/977	mg/kg bw/d	N		DLY	U	GV	12	d	6	d	JV	M	C	GRO	BDWT	WO	977		Y	0.00853	N	0.00137	534		10	8	10	5	10	8	4	10	10	4	79
269	2758	Maker et al., 1973	Lead carbonate	100	Mouse (*Mus musculus*)	7	0/0.08/0.16/0.4/0.5/1.0/2.0	% in diet	N		NR	U	FD	30	d	NR	NR	LC	F	C	GRO	BDWT	WO	0.500	1.00	N	0.0325	N	0.00411	632	1260	10	10	5	5	5	8	10	10	10	4	77
270	2869	Selvin-Testa et. al. 1997	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/1	% in water	N		ADL	U	DR	126	d	1	d	GE	F	C	GRO	BDWT	WO	1.00		N	0.156	N	0.0186	651		10	5	5	5	8	4	10	10	4	66
271	2818	Piasek and Kostial 1991	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/750	mg/kg bw/d	N		NR	U	DR	20	w	10	w	GE	F	C	GRO	BDWT	WO	750		Y	0.2681	N	0.03028	750		10	5	5	5	10	8	4	10	10	4	71
272	2758	Maker et al., 1973	Lead carbonate	100	Mouse (*Mus musculus*)	7	0/0.08/0.16/0.4/0.5/1.0/2.0	% in diet	N		NR	U	FD	28	d	NR	NR	LC	F	C	GRO	BDWT	WO	1.00	2.00	N	0.0325	N	0.00411	1260	2530	10	10	5	5	5	8	10	10	10	4	77
273	10239	Barrett and Livesey, 1983	Lead	100	Rat (*Rattus norvegicus*)	4	0/0.2/0.4/1.0	% in diet	N		DLY	U	FD	18	d	NR	NR	LC	F	C	GRO	BDWT	WO	1.00		Y	0.296	Y	0.054	1500		10	10	5	10	7	8	4	3	10	4	71
274	252	Schroeder et al, 1970	Lead nitrate	100	Rat (*Rattus norvegicus*)	2	0/25	mg/L	N		ADL	U	DR	9	d	21	d	JV	M	C	GRO	BDWT	WO		25.0	Y	0.0557	N	0.00736		3.3	10	5	5	10	6	8	4	10	10	4	72
275	14377	Kelliher, et al. 1973	Lead acetate	100	Cattle (Bos taurus)	2	0.015	g/kg bw/d	N		CON	U	FD	283	d	7	mo	JV	M	C	GRO	BDWT	WO		0.0150	Y	260	N	6.63842		15.0	10	10	5	5	10	8	4	10	10	4	76
276	2670	Hamilton and O'Flaherty, 1994	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/250/1000	mg/L	N		ADL	U	DR	92	d	25	d	GE	F	V	MPH	GMPH	TB		250	Y	0.224	N	0.02575		28.7	10	5	5	5	6	8	4	10	10	7	70
277	2678	Hammond and Succop, 1995	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/250	mg/L	N		ADL	U	DR	5	d	26	d	JV	F	C	GRO	BDWT	WO		250	N	0.204	N	0.02368		29.0	10	5	5	5	5	8	4	10	10	4	66
278	2671	Hamilton et al., 1994	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/250/500/1000	mg/L	N		ADL	U	DR	7	d	25	d	GE	F	V	GRO	BDWT	WO		250	N	0.202	N	0.02346		29.0	10	5	5	5	5	8	4	10	10	4	66
279	2677	Hammond et al., 1993	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/250	mg/L	N		ADL	U	DR	26	d	22	d	JV	F	V	GRO	BDWT	WO		250	Y	0.175	N	0.02062		29.5	10	5	5	5	6	8	4	10	10	7	70
280	2677	Hammond et al., 1993	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/250	mg/L	N		ADL	U	DR	14	d	26	d	JV	F	V	MPH	Other	TA		250	N	0.15	N	0.01795		29.9	10	5	5	5	5	8	4	10	10	7	69
281	2776	Minnema and Hammond, 1994	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/250	mg/L	N		NR	U	DR	10	d	26	d	JV	F	V	GRO	BDWT	WO		250	Y	0.13	N	0.01578		30.4	10	5	5	5	6	8	4	10	10	4	67
282	20974	Al-Omar et al, 2000	Lead oxide	92.83	Mouse (*Mus musculus*)	2	0/50	mg/kg bw/d	N		DLY	M	GV	3	w	NR	NR	JV	M	V	GRO	BDWT	WO		50.0	Y	0.02197	N	0.00298		46.4	10	8	10	10	10	8	4	10	10	4	84
283	2929	White, 1977	Lead carbonate	100	Dog (*Canis familiaris*)	2	0/50	mg/kg bw	N		DLY	U	OR	5	w	<1	yr	JV	NR	C	GRO	BDWT	WO		50	N	10.45	N	0.4728		50.0	10	8	10	10	10	8	4	10	10	4	84
284	2807	Pankakoski et al., 1994	Lead	100	Shrew (*Sorex araneus*)	4	0/371/423/1052	mg/kg diet	N		ADL	M	FD	31	d	NR	NR	JV	B	C	GRO	BDWT	WO		371	Y	0.0071	N	0.00118		61.5	10	10	10	4	6	8	4	10	10	4	76
285	2870	Shailesh Kumar and Desiraju, 1990	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/100/400	mg/kg bw	N		6 per w	U	GV	58	d	2	d	JV	B	C	GRO	BDWT	WO		100	Y	0.075	N	0.00817		100	10	8	10	5	10	8	4	10	10	4	79
286	14376	Hsu et al, 1975	Lead acetate	100	Pig (*Sus scrofa*)	2	0/1000	mg/L	N		ADL	U	FD	13	w	4	w	JV	NR	NR	GRO	BDWT	WO		1000	Y	7.5	Y	1.296		173	10	10	5	5	7	8	4	10	10	4	73
287	2680	Harry et al., 1985	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg bw	N		DLY	U	GV	29	d	2	d	JV	F	V	GRO	BDWT	WO		200	Y	0.065	N	0.00726		200	10	8	10	5	10	8	4	10	10	4	79
288	2750	Lessler and Wright, 1976	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/68	mg/org/d	N		ADL	U	FD	5	w	NR	NR	MA	NR	C	GRO	BDWT	WO		68	Y	0.25	N	0.02198		272	10	10	5	5	6	8	4	10	10	4	72
289	2827	Press 1975	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/328	mg/kg bw/d	N		DLY	U	GV	6	d	1	d	JV	B	C	GRO	BDWT	WO		328	N	0.248	N	0.02184		328	10	8	10	5	10	8	4	10	10	4	79
290	2887	Sokol, 1989	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/6000	mg/L	N		ADL	U	DR	30	d	27	d	JV	M	C	GRO	BDWT	WO		6000	Y	0.412	N	0.04457		354	10	5	5	5	6	8	4	10	10	4	67
291	2846	Ronis et al., 1996	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/6000	mg/L	N		ADL	U	DR	50	d	24	d	JV	M	C	GRO	BDWT	WO		6000	Y	0.26	N	0.02945		371	10	5	5	5	6	8	4	10	10	4	67
292	2911	Toews et al., 1983	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/400	mg/kg bw/d	N		6 per w	U	GV	28	d	2	d	JV	M	C	GRO	BDWT	WO		400	Y	0.075	N	0.00817		400	10	8	10	5	10	8	4	10	10	4	79
293	2697	Holtzman et al., 1982	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/400/800/1200	mg/kg bw/d	N		DLY	U	GV	14	d	18	d	JV	NR	C	GRO	BDWT	WO		400	N	0.267	N	0.0232		400	10	8	10	5	10	8	4	10	10	4	79
294	2836	Rasile et. al. 1995	Lead acetate	54.61	Mouse (*Mus musculus*)	2	0/0.5	% in water	N		ADL	U	DR	45	d	50-100	d	GE	F	C	GRO	BDWT	WO		0.500	Y	0.018	N	0.00266		404	10	5	5	5	6	8	4	10	10	4	67
295	2783	Mykkanen et al., 1980	Lead acetate	54.61	Rat (*Rattus norvegicus*)	4	0/1/2	% in diet	N		ADL	U	FD	1	w	NR	NR	LC	F	C	GRO	BDWT	WO		1.00	N	0.4	N	0.03235		442	10	10	5	5	5	8	4	10	10	4	71
296	14751	Piasek et al, 1988	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/5500	mg/L	N		ADL	U	DR	6	w	14	w	LC	F	C	GRO	BDWT	WO		5500	Y	0.2045	N	0.02373		638	10	5	5	5	6	8	4	10	10	4	67
297	2837	Gulati et al, 1985	Lead acetate trihydrate	100	Mouse (*Mus musculus*)	4	0/4.98/10.055/20.52	mg/ml	Y		ADL	M	DR	10	w	11	w	JV	F	C	GRO	BDWT	WO		5.08	Y	0.04	Y	0.0056		748	10	5	10	5	7	8	4	10	10	4	73
298	2523	Barlow et al., 1977	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/2	% in diet	N		ADL	U	FD	21	d	NR	NR	LC	F	C	GRO	BDWT	WO		2.00	Y	0.21	N	0.01905		991	10	10	5	5	6	8	4	10	10	4	72
299	2546	Brashear et al., 1978	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/1.0	g/kg bw/d	N		DLY	U	GV	18	d	2	d	JV	B	C	GRO	BDWT	WO		1.00	N	0.248	N	0.02184		1000	10	8	10	5	10	8	4	10	10	4	79
300	14822	Gerber et al, 1978	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/1.0	% in diet	N		NR	U	FD	2	w	0	d	JV	NR	C	GRO	BDWT	WO		1.00	Y	0.0165	N	0.0024		1430	10	10	5	5	6	8	4	10	10	4	72
301	2697	Holtzman et al., 1982	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/1600/2000/2400	mg/kg bw/d	N		DLY	U	GV	14	d	24	d	JV	NR	C	GRO	BDWT	WO		1600	N	0.267	N	0.0232		1600	10	8	10	5	10	8	4	10	10	4	79
302	2698	Holtzman et al., 1981	Lead carbonate	77.55	Rat (*Rattus norvegicus*)	2	0/4	% in diet	N		ADL	U	FD	2	w	60-80	d	JV	M	C	GRO	BDWT	WO		4.00	N	0.523	N	0.04032		2390	10	10	5	10	5	8	4	10	3	4	69
303	2697	Holtzman et al., 1982	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/2400/3200	mg/kg bw/d	N		DLY	U	GV	14	d	16	d	JV	NR	C	GRO	BDWT	WO		2400	N	0.267	N	0.0232		2400	10	8	10	5	10	8	4	10	10	4	79
304	14827	Holtzman et al, 1980	Lead carbonate	77.55	Rat (*Rattus norvegicus*)	2	0/4	% in diet	N		ADL	U	FD	14	d	60	d	JV	M	C	GRO	BDWT	WO		4.00	Y	0.2929	N	0.02504		2650	10	10	5	10	6	8	4	10	10	4	77
Survival																																													
305	1858	Schroeder and Mitchener, 1975	Lead acetate	100	Mouse (*Mus musculus*)	2	0/25	mg/L	N		NR	U	DR	669	d	19-20	d	JV	B	C	MOR	LFSP	WO	25.0		Y	0.031	N	0.00434	3.50		10	5	5	5	6	9	4	10	10	4	68
306	2725	Junaid et al., 1997	Lead acetate	100	Mouse (*Mus musculus*)	4	0/2/4/8	mg/kg bw/d	N		5 per w	U	GV	60	d	NR	NR	AD	F	V	MOR	MORT	WO	4.00	8.00	N	0.0225	N	0.00304	4.00	8.00	10	8	10	5	10	9	10	10	6	4	82
307	3711	Lynch et al., 1976	Lead carbonate	100	Cattle (*Bos taurus*)	3	0/4.16/7.79	mg/kg bw/d	N		3 per w	U	OR	84	d	NR	NR	JV	M	C	MOR	SURV	WO	7.79		Y	80.2	Y	0.157	7.79		10	8	10	10	10	9	4	10	10	4	85
308	2751	Lorenzo et al., 1978	Lead nitrate	62.56	Rabbit (*Oryctolagus cuniculus*)	5	0/10.7/50.4	mg/kg bw/d	N		DLY	U	GV	30	d	1	d	JV	F	C	MOR	MORT	WO	10.7	50.4	N	3.1	N	0.17412	10.7	50.4	10	8	10	10	5	9	8	10	10	4	84
309	3747	Azar et al., 1973	Lead acetate	100	Rat (*Rattus norvegicus*)	5	0/18/62/141/548	mg/kg diet	N		NR	M	FD	2	yr	NR	NR	NR	M	C	MOR	MORT	WO	141	548	N	0.51	N	0.0395	10.9	42.4	10	10	10	5	5	9	8	10	10	4	81
310	3889	Logner et al., 1984	Lead sulfate	100	Cattle (*Bos taurus*)	4	0/16/43/305	mg/kg bw/d	N		ADL	U	FD	10	d	74	d	JV	M	C	MOR	MORT	WO	16.0	43.0	Y	92.49	Y	3.64	16.0	43.0	10	10	5	10	10	9	10	10	10	4	88
311	3747	Azar et al., 1973	Lead acetate	100	Dog (*Canis familiaris*)	5	0/16/57/155/576	mg/kg diet	N		NR	M	FD	2	yr	NR	NR	NR	B	C	MOR	MORT	WO	576		N	14	N	0.60128	24.7		10	10	10	5	5	9	4	1	10	4	68

Appendix 6.1 Mammalian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
Lead

Ref			Exposure																				Effects					Conversion to mg/kg bw/day				Result		Data Evaluation Score											
Result #	Ref N.		Chemical Form	MW%	Test Species	# of Conc/ Doses	Conc/ Doses	Conc/Dose Units	Wet Weight Reported?	Percent Moisture	Application Frequency	Method of Analyses	Route of Exposure	Exposure Duration	Duration Units	Age	Age Units	Lifestage	Sex	Control Type	Effect Type	Effect Measure	Response Site	Study NOAEL	Study LOAEL	Body Weight Reported?	Body Weight in kg	Ingestion Rate Reported?	Ingestion Rate in kg or L/day	NOAEL Dose (mg/kg/day)	LOAEL Dose (mg/kg/day)	Data Source	Dose Route	Test Concentrations	Chemical form	Dose Quantification	Endpoint	Dose Range	Statistical Power	Exposure Duration	Test Conditions	Total
312	2720	Jessup, 1967	Lead acetate	100	Rabbit (*Oryctolagus cuniculus*)	3	0/54.6/546	mg/kg diet	N		ADL	U	FD	10	d	NR	NR	GE	F	C	MOR	MORT	WO	546		N	4.1	N	0.2191	29.2		10	10	5	5	5	9	4	10	10	4	72
313	3709	Lassen and Buck, 1979	Lead acetate	100	Pig (*Sus scrofa*)	5	0/3.77/7.54/15.09/30.17	mg/kg bw/d	N		DLY	U	DR	13	w	6	w	JV	NR	C	MOR	MORT	WO	30.2		Y	24	N	1.72912	30.2		10	5	10	5	10	9	4	1	10	4	68
314	14852	Bankowska and Hine, 1985	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/350	mg/L	N		ADL	U	DR	4	w	NR	NR	JV	M	C	MOR	MORT	WO	350		Y	0.22	N	0.02534	40.3		10	5	5	5	6	9	4	10	10	4	68
315	20974	Al-Omar et al, 2000	Lead oxide	92.83	Mouse (*Mus musculus*)	2	0/50	mg/kg bw/d	N		DLY	M	GV	5	w	NR	NR	JV	M	V	MOR	MORT	WO	50.0		Y	0.02063	N	0.00283	46.4		10	8	10	10	10	9	4	10	10	4	85
316	2565	Carpenter, 1982	Lead acetate	100	Hamster (*Mesocricetus auratus*)	2	0/547	mg/L	N		ADL	U	DR	51	d	15	w	GE	F	C	MOR	MORT	WO	547		Y	0.167	N	0.0198	64.8		10	5	5	5	6	9	4	10	10	4	68
317	2565	Carpenter, 1982	Lead acetate	100	Hamster (*Mesocricetus auratus*)	2	0/547	mg/L	N		ADL	U	DR	14	d	11	w	GE	F	C	MOR	MORT	WO	547		Y	0.163	N	0.0193	64.9		10	5	5	5	6	9	4	10	10	4	68
318	11831	Jessup and Shott, 1969	Lead acetate	100	Rat (*Rattus norvegicus*)	5	0/10/50/100/1000	mg/kg diet	N		ADL	U	FD	92	w	21	d	JV	B	C	MOR	SURV	WO	1000		Y	0.615	N	0.04607	74.9		10	10	5	5	6	9	4	10	10	4	73
319	2721	Jessup, 1969	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/10/100/1000	mg/kg diet	N		ADL	U	FD	8	w	NR	NR	GE	B	C	MOR	SURV	WO	1000		Y	0.46	N	0.0363	78.8		10	10	5	5	6	9	4	10	10	4	73
320	3747	Azar et al., 1973	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/1130/2102	mg/kg diet	N		NR	M	FD	2	yr	NR	NR	NR	M	C	MOR	MORT	WO	1130	2102	N	0.51	N	0.0395	87.5	163	10	10	10	5	5	9	10	10	10	4	83
321	2502	Wolfe et al, 1996	Lead acetate trihydrate	100	Rat (*Rattus norvegicus*)	5	0/0.78/20.64/41.24/103.63	mg/kg bw/d	N		ADL	M	DR	24	w	94	d	JV	M	C	MOR	MORT	WO	104		Y	0.75394	Y	0.026	104		10	5	10	5	10	9	4	10	10	4	77
322	2750	Lessler and Wright, 1976	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/68	mg/org/d	N		ADL	U	FD	24	w	NR	NR	YO	M	C	MOR	MORT	WO	68.0		Y	0.400	N	0.03235	170		10	10	5	5	6	9	4	10	10	4	73
323	2750	Lessler and Wright, 1976	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/68	mg/org/d	N		ADL	U	FD	8	w	NR	NR	MA	M	C	MOR	MORT	WO	68.0		Y	0.4	N	0.03235	170		10	10	5	5	6	9	4	10	3	4	66
324	2815	Petrusz et al., 1979	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/25/100/200	mg/kg bw/d	N		DLY	U	GV	18	d	2	d	JV	B	C	MOR	MORT	WO	200		N	0.035	N	0.00437	200		10	8	10	5	10	9	4	10	10	4	80
325	2799	Ogilvie and Martin, 1981	Lead acetate	100	Mouse (*Mus musculus*)	2	0/2732	mg/L	N		NR	U	DR	10	mo	NR	NR	AD	M	C	MOR	MORT	WO	2732		Y	0.034	N	0.00472	379		10	5	5	5	6	9	4	10	10	4	68
326	2697	Holtzman et al., 1982	Lead acetate	100	Rat (*Rattus norvegicus*)	5	0/400/800/1600/2400	mg/kg bw/d	N		DLY	U	GV	14	d	20	d	JV	NR	C	MOR	MORT	WO	400	800	N	0.267	N	0.0232	400	800	10	8	10	5	10	9	10	10	10	4	86
327	2697	Holtzman et al., 1982	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/400/800/1600	mg/kg bw/d	N		DLY	U	GV	14	d	24	d	JV	NR	C	MOR	MORT	WO	400	800	N	0.267	N	0.0232	400	800	10	8	10	5	10	9	10	10	10	4	86
328	2836	Rasile et. al. 1995	Lead acetate	54.61	Mouse (*Mus musculus*)	2	0/0.5	% in water	N		ADL	U	DR	98	d	50-100	d	GE	F	C	MOR	MORT	WO	0.500		Y	0.018	N	0.00266	404		10	5	5	5	6	9	4	10	10	4	68
329	2817	Piasekand Kostial, 1987	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/216/420/639.36	mg/kg bw/d	N		ADL	U	DR	18	w	NR	NR	JV	M	C	MOR	MORT	WO	639		Y	0.25	Y	0.04	639		10	5	5	5	10	9	4	10	10	4	72
330	2697	Holtzman et al., 1982	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/1600/2000/2400	mg/kg bw/d	N		DLY	U	GV	14	d	24	d	JV	NR	C	MOR	MORT	WO	2000	2400	N	0.267	N	0.0232	2000	2400	10	8	10	5	10	9	10	10	10	4	86
331	2697	Holtzman et al., 1982	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/2400/3200	mg/kg bw/d	N		DLY	U	GV	14	d	14	d	JV	NR	C	MOR	MORT	WO	3200		N	0.267	N	0.0232	3200		10	8	10	5	10	9	4	10	10	4	80
332	3701	Kanisawa and Schroeder, 1969	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/5	mg/L	N		DLY	U	DR	727	d	30	d	JV	F	C	MOR	LFSP	WO		5.00	N	0.248	N	0.02823		0.569	10	5	5	5	5	9	4	10	10	4	67
333	3940	Zmudski et al., 1983	Lead acetate	100	Cattle (*Bos taurus*)	4	0/2.7/5.0/20	mg/kg bw/d	N		DLY	U	DR	21	d	10	w	JV	M	C	MOR	MORT	WO		2.70	Y	55	N	3.64722		2.70	10	5	5	5	10	9	4	10	10	4	72
334	14446	Schroeder et al, 1963	Lead	100	Rat (*Rattus norvegicus*)	2	0/25	mg/L	N		DLY	U	DR	6	mo	28	d	JV	B	C	MOR	SURV	WO		25.0	Y	0.2251	N	0.02587		2.87	10	5	5	4	6	9	4	10	10	4	67
335	14447	Schroeder et al, 1964	Divalent Lead	100	Mouse (*Mus musculus*)	2	0/25	mg/L	N		DLY	U	DR	21	mo	21	d	JV	M	C	MOR	SURV	WO		25.0	N	0.0375	Y	0.00465		3.10	10	5	5	10	6	9	4	10	10	4	73
336	14803	Wells, et.al, 1986	Lead acetate	100	Cattle (*Bos taurus*)	2	0/20	mg/kg bw/d	N		DLY	U	DR	8	d	3	mo	JV	M	C	MOR	MORT	WO		20.0	N	na	N	na		20.0	10	5	5	5	10	9	4	10	10	4	72
337	2807	Pankakoski et al., 1994	Lead	100	Shrew (*Sorex araneus*)	4	0/371/423/1052	mg/kg diet	N		ADL	M	FD	31	d	NR	NR	JV	B	C	MOR	MORT	WO		371	Y	0.0071	N	0.00118		61.5	10	10	10	4	6	9	4	10	10	4	77
338	2827	Press 1975	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/328	mg/kg bw/d	N		DLY	U	GV	14	d	1	d	JV	B	C	MOR	MORT	WO		328	N	0.248	N	0.02184		328	10	8	10	5	10	9	4	10	10	4	80
339	2870	Shailesh Kumar and Desiraju, 1990	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/400	mg/kg bw	N		6 per w	U	GV	58	d	2	d	JV	B	C	MOR	MORT	WO		400	Y	0.075	N	0.00817		400	10	8	10	5	10	9	8	10	10	4	84
340	2697	Holtzman et al., 1982	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/400/800/1200	mg/kg bw/d	N		DLY	U	GV	14	d	16	d	JV	NR	C	MOR	MORT	WO		400	N	0.267	N	0.0232		400	10	8	10	5	10	9	4	10	10	4	80
341	2618	Eyden et al, 1978	Lead acetate	100	Mouse (*Mus musculus*)	6	0/0.5/1.0/2.0/3.0/4.0	% in diet	N		ADL	U	FD	115	d	NR	NR	AD	B	C	MOR	SURV	WO		0.500	N	0.0317	N	0.00403		635	10	10	5	5	5	9	4	10	10	4	72
342	2837	Gulati et al, 1985	Lead acetate trihydrate	100	Mouse (*Mus musculus*)	4	0/4.98/10.055/20.52	mg/ml	Y		ADL	M	DR	18	w	11	w	JV	B	C	MOR	MORT	WO		4.84	Y	0.0369	Y	0.00485		670	10	5	10	5	7	9	4	10	10	4	74
343	2505	Lamb et al., 1997	Lead acetate trihydrate	100	Mouse (*Mus musculus*)	4	0/0.67/1.00/1.50	g/kg bw/d	N		ADL	U	DR	105	d	6	w	JV	B	C	MOR	MORT	WO		0.670	Y	0.0376	N	0.00517		670	10	5	5	5	10	9	4	10	10	4	72
Data Not Used to Derive Wildlife Toxicity Reference Value																																												
344	14386	Willoughby et al., 1972	Lead carbonate	100	Horse (*Equus caballus*)	2	0/30	mg/kg diet	N		DLY	U	FD	15	d	20 to 21	w	JV	M	C	FDB	FCNS	WO	30.0		N	181.44	Y	1.151	0.150		10	10	5	10	6	4	4	1	10	4	64
345	2879	Singh et al., 1991	Lead acetate	100	Rat (*Rattus norvegicus*)	5	0/250/500/1000/2000	mg/L	N		DLY	U	DR	6	d	90	d	GE	F	C	FDB	FCNS	WO	2000		N	0.2228	Y	0.0194	0.174		10	5	5	5	6	4	4	10	10	4	63
346	136	Gershbein et al 1983	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/10	mg/kg diet	N		ADL	U	FD	80	d	44	d	JV	M	C	BEH	NMVM	WO	10.0		Y	0.47	N	0.03693	0.429		10	10	5	5	6	4	4	3	10	4	61
347	136	Gershbein et al 1983	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/10	mg/kg diet	N		ADL	U	FD	80	d	44	d	JV	M	C	GRO	BDWT	WO	10.0		Y	0.47	N	0.03693	0.429		10	10	5	5	6	8	4	1	10	4	63
348	136	Gershbein et al 1983	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/10	mg/kg diet	N		ADL	U	FD	80	d	44	d	JV	M	C	HIS	GHIS	NR	10.0		Y	0.47	N	0.03693	0.429		10	10	5	5	6	4	4	1	10	4	59
349	2634	Fox et.al., 1982	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/0.5	ug/g bw/d	N		ADL	U	FD	21	d	0	d	JV	F	C	ORW	ORWT	BR	0.500		N	0.179	N	0.0167	0.500		10	10	5	5	10	4	4	1	10	4	63
350	15061	Kanisawa and Schroeder, 1969	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/5	mg/L	N		DLY	U	DR	18	mo	21	d	JV	B	C	PHY	BLPR	BL	5.00		N	0.248	N	0.02823	0.569		10	5	5	5	5	4	4	1	10	4	53
351	15061	Kanisawa and Schroeder, 1969	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/5	mg/L	N		DLY	U	DR	42	mo	21	d	JV	B	C	HIS	GHIS	KI	5.00		N	0.248	N	0.02823	0.569		10	5	5	5	5	4	4	1	10	4	53
352	2616	Escribano et al., 1997	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/17	mg/kg diet	N		NR	U	FD	50	d	NR	NR	JV	F	C	ORW	ORWT	VE	17.0		Y	0.2756	N	0.02382	0.802		10	10	5	5	6	4	4	10	3	4	61
353	2877	Singh and Ashraf, 1989	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/1.0	mg/kg bw/d	N		6 per w	U	GV	10	w	5	w	JV	B	C	HRM	NORE	BR	1.00		N	0.235	N	0.02089	1.00		10	8	10	5	10	1	4	3	10	4	65
354	2705	Hubermont et al., 1976	Lead nitrate	100	Rat (*Rattus norvegicus*)	4	0/0.1/1.0/10	mg/L	N		NR	U	DR	9	w	10	w	GE	F	C	ENZ	ALAD	BL	10.0		N	0.338	N	0.0373	1.10		10	5	5	10	5	1	4	1	10	4	55
355	707	Dobryszycka et al., 1984	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/0.82	mg/org	N		DLY	U	GV	12	mo	3	mo	JV	B	C	ENZ	LADH	KI	0.820		N	0.462	N	0.03642	1.77		10	8	10	10	5	1	4	1	10	4	63
356	252	Schroeder et al, 1970	Lead nitrate	100	Rat (*Rattus norvegicus*)	2	0/25	mg/L	N		ADL	U	DR	519	d	21	d	JV	M	C	MOR	TDTH	WO	25.0		Y	0.4615	N	0.0493	2.67		10	5	5	10	6	9	4	1	10	4	64
357	2889	Sourgens et al., 1987	Lead acetate trihydrate	54.61	Rat (*Rattus norvegicus*)	4	0/45/900/4580	mg/L	N		ADL	U	DR	30	d	NR	NR	JV	F	C	ORW	ORWT	TY	45.0	900	Y	0.156	N	0.0186	2.93	58.6	10	5	5	5	6	4	6	10	10	4	65
358	2716	Jadhav and Ramesh, 1997	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/50	mg/L	N		NR	U	DR	30	d	21	d	JV	M	C	FDB	WCON	WO	50.0		N	0.248	N	0.02823	3.11		10	5	5	5	5	4	4	1	10	7	56
359	2716	Jadhav and Ramesh, 1997	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/50	mg/L	N		NR	U	DR	30	d	NR	NR	GE	M	C	GRO	BDWT	WO	50.0		N	0.248	N	0.02823	3.11		10	5	5	5	5	8	4	1	10	7	60
360	1858	Schroeder and Mitchener, 1975	Lead acetate	100	Mouse (*Mus musculus*)	2	0/25	mg/L	N		NR	U	DR	520	d	19-20	d	JV	F	C	GRO	BDWT	WO	25.0		Y	0.0427	N	0.00579	3.39		10	5	5	5	6	8	4	8	10	4	65
361	15506	Schroeder, 1968	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/3.620	mg/kg bw/d	N		ADL	U	DR	737	d	NR	NR	AD	B	C	CHM	CHOL	SR	3.62		N	0.235	N	0.02689	3.62		10	5	5	5	10	1	4	6	10	4	60
362	25886	Hamir et al, 1999	Lead acetate	100	Raccoon (*Procyon lotor*)	4	0/1/2/4	mg/kg bw/d	N		5 per w	U	FD	8	w	1	d	JV	B	C	CHM	PCLV	BL	4.00		Y	8.25	N	0.3893	4.00		10	10	5	5	10	1	4	1	3	4	53
363	25886	Hamir et al, 1999	Lead acetate	100	Raccoon (*Procyon lotor*)	4	0/1/2/4	mg/kg bw/d	N		5 per w	U	FD	8	w	5-6	mo	JV	B	C	GRS	BDWT	WO	4.00		Y	8.25	N	0.3893	4.00		10	10	5	5	10	4	4	1	3	4	56

Appendix 6.1 Mammalian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
Lead

Ref			Exposure																				Effects					Conversion to mg/kg bw/day				Result		Data Evaluation Score										
Result #	Ref N.		Chemical Form	MW%	Test Species	# of Conc/ Doses	Conc/ Doses	Conc/Dose Units	Wet Weight Reported?	Percent Moisture	Application Frequency	Method of Analyses	Route of Exposure	Exposure Duration	Duration Units	Age	Age Units	Lifestage	Sex	Control Type	Effect Type	Effect Measure	Response Site	Study NOAEL	Study LOAEL	Body Weight Reported?	Body Weight in kg	Ingestion Rate Reported?	Ingestion Rate in kg or L/day	NOAEL Dose (mg/kg/day)	LOAEL Dose (mg/kg/day)	Data Source	Dose Route	Test Concentrations	Chemical form	Dose Quantification	Endpoint	Dose Range	Statistical Power	Exposure Duration	Test Conditions	Total
364	2640	Freundt and Ibrahim, 1990	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/100	mg/L	N		ADL	U	DR	91	d	NR	NR	AD	F	C	GRO	BDWT	WO	100		Y	0.295	N	0.033	6.11		10	5	5	5	6	8	4	1	10	4	58
365	2857	Saxena et. al. 1989	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/1.920	mg/org/d	N		ADL	U	DR	120	d	NR	NR	JV	M	C	GRO	BDWT	WO	1.92		Y	0.284	N	0.03189	6.76		10	5	5	5	6	8	4	6	10	4	63
366	3821	Boscolo et al., 1988	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/0.06	mg/ml	N		ADL	U	DR	18	mo	NR	NR	NR	M	C	GRO	BDWT	WO	0.0600		N	0.267	N	0.03016	6.78		10	5	5	5	5	8	4	1	10	4	57
367	3821	Boscolo et al., 1988	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/0.06	mg/ml	N		ADL	U	DR	18	mo	NR	NR	JV	M	C	REP	TEDG	TE	0.0600		N	0.267	N	0.03016	6.78		10	5	5	5	5	10	4	1	10	4	59
368	2737	Kimmel et al., 1980	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/0.92/4.7/8.9	mg/kg bw/d	N		ADL	U	DR	10	w	21	d	GE	F	V	FDB	FCNS	WO	8.90		Y	300	N	16.7898	8.90		10	5	5	5	10	4	4	1	10	7	61
369	2830	Rader et al., 1981	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/9.3	mg/kg bw/d	N		ADL	U	DR	6	w	NR	NR	AD	M	C	GRO	BDWT	WO	9.30		Y	0.468	N	0.04999	9.30		10	5	5	5	10	8	4	10	3	4	64
370	2770	McMurry et al., 1995	Lead acetate	100	Cotton rat (*Sigmodon hispidus*)	3	0/2.2/30.4	mg/org	N		ADL	U	DR	13	w	NR	NR	AD	M	C	CHM	LMPH	BL	2.20	30.4	Y	0.1698	N	na	13.0	179	10	5	5	5	6	1	6	10	6	4	58
371	2770	McMurry et al., 1995	Lead acetate	100	Cotton rat (*Sigmodon hispidus*)	3	0/2.2/30.4	mg/org	N		ADL	U	DR	13	w	NR	NR	AD	M	C	ORW	SMIX	SP	2.20	30.4	Y	0.1698	N	na	13.0	179	10	5	5	5	6	4	6	10	6	4	61
372	2563	Camoratto et al., 1993	Lead nitrate	100	Rat (*Rattus norvegicus*)	2	0/125	mg/L	N		ADL	U	DR	49	d	NR	NR	GE	F	C	FDB	WCON	WO	125		N	0.35	N	0.03849	13.7		10	5	5	10	5	4	4	1	10	4	58
373	2563	Camoratto et al., 1993	Lead nitrate	100	Rat (*Rattus norvegicus*)	2	0/125	mg/L	N		ADL	U	DR	49	d	2	d	JV	F	C	HRM	Other	MT	125		N	0.35	N	0.03849	13.7		10	5	5	10	5	1	4	1	10	4	55
374	2563	Camoratto et al., 1993	Lead nitrate	100	Rat (*Rattus norvegicus*)	2	0/125	mg/L	N		ADL	U	DR	49	d	NR	NR	GE	F	C	GRO	BDWT	WO	125		N	0.35	N	0.03849	13.7		10	5	5	10	5	8	4	1	10	4	62
375	2563	Camoratto et al., 1993	Lead nitrate	100	Rat (*Rattus norvegicus*)	2	0/125	mg/L	N		ADL	U	DR	23	d	NR	NR	GE	F	C	REP	PRWT	WO	125		N	0.35	N	0.03849	13.7		10	5	5	10	5	10	4	1	10	4	64
376	2829	Rader et. al. 1981	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/16.1	mg/kg bw/d	N		NR	U	DR	7	w	NR	NR	AD	M	C	GRO	BDWT	WO	16.1		Y	0.392	N	0.043	16.1		10	5	5	5	10	8	4	10	3	4	64
377	2918	Verlangieri et al., 1983	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/74.5	mg/L	N		ADL	U	DR	52	w	NR	NR	JV	B	C	GRO	BDWT	WO	74.5		Y	0.606	Y	0.13366	16.4		10	5	5	5	7	8	4	6	10	4	64
378	14822	Gerber et al, 1978	Lead acetate	100	Mouse (*Mus musculus*)	3	0/0.1/1.0	mg/ml	N		NR	U	DR	10	d	0	d	JV	M	C	ENZ	ALAD	BR	0.100	1.00	Y	0.00452	N	0.0008	17.0	170	10	5	5	5	6	1	8	10	10	4	64
379	2905	Tafelski and Lamperti, 1975	Lead acetate	54.61	Rat (*Rattus norvegicus*)	4	0/1/5/10	mg/org	N		DLY	U	GV	29	d	NR	NR	SM	F	C	HIS	GHIS	OV	10.0		Y	0.289	N	0.02476	18.9		10	8	10	5	6	4	4	1	6	4	58
380	2905	Tafelski and Lamperti, 1975	Lead acetate	54.61	Rat (*Rattus norvegicus*)	4	0/1/5/10	mg/org	N		DLY	U	GV	29	d	NR	NR	SM	F	C	REP	RPRD	UT	10.0		Y	0.289	N	0.02476	18.9		10	8	10	5	6	10	4	1	6	4	64
381	2575	Corpas et al , 1995	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/39.26	mg/kg bw/d	N		ADL	U	DR	3	w	NR	NR	GE	F	C	FDB	WCON	WO	39.3		N	0.32	Y	0.04248	21.4		10	5	5	5	10	4	4	3	10	4	60
382	2756	Mahaffey et al., 1973	Lead acetate	100	Rat (*Rattus norvegicus*)	7	0/0.19/0.70/2.8/5.9/12.9/24.3	mg/kg bw/d	N		NR	U	DR	10	w	NR	NR	JV	M	C	ORW	ORWT	KI	24.3		Y	0.31	N	0.0345	24.3		10	5	5	5	10	4	4	8	10	4	65
383	2943	Zenick et al., 1979	Lead acetate	54.61	Rat (*Rattus norvegicus*)	3	0/200/400	mg/kg	N		DLY	U	DR	121	d	21	d	GE	F	C	BEH	ACTV	WO	400		N	0.204	N	0.0237	25.4		10	5	5	5	5	4	4	1	10	4	53
384	2943	Zenick et al., 1979	Lead acetate	54.61	Rat (*Rattus norvegicus*)	3	0/200/400	mg/L	N		DLY	U	DR	121	d	21	d	GE	F	C	GRO	BDWT	WO	400		N	0.204	N	0.0237	25.4		10	5	5	5	5	8	4	1	10	4	57
385	10607	Cerklewski, 1980	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/250	mg/kg diet	N		NR	U	FD	20	d	70	d	LC	F	C	GRO	BDWT	WO	250		Y	0.363	Y	0.04	27.5		10	10	5	5	7	8	4	1	10	4	64
386	2720	Jessup, 1967	Lead acetate	100	Rabbit (*Oryctolagus cuniculus*)	3	0/54.6/546	mg/kg diet	N		ADL	U	FD	10	d	NR	NR	GE	F	C	REP	Other	UT	546		N	4.1	N	0.2191	29.2		10	10	5	5	5	10	4	1	10	4	64
387	3704	Fick et al., 1976	Lead acetate	100	Sheep (*Ovis aries*)	5	0/10/100/500/1000	mg/kg diet	N		DLY	U	FD	84	d	NR	NR	JV	M	C	FDB	FCNS	WO	1000		Y	37	Y	1.21	32.7		10	10	5	5	7	4	4	6	10	4	65
388	2682	Hasan et al., 1989	Lead chloride	74.5	Rat (*Rattus norvegicus*)	2	0/400	mg/L	N		NR	U	DR	42	d	NR	NR	LC	F	C	FDB	FCNS	WO	400		N	0.32	N	0.0355	33.1		10	5	5	10	5	4	4	1	10	4	58
389	2780	Murphy et al., 1995	Lead chloride	74.5	Rat (*Rattus norvegicus*)	2	0/400	mg/L	N		ADL	U	DR	30	d	NR	NR	LC	F	C	FDB	FCNS	WO	400		N	0.32	N	0.0355	33.1		10	5	5	10	5	4	4	1	10	4	58
390	2682	Hasan et al., 1989	Lead chloride	74.5	Rat (*Rattus norvegicus*)	2	0/400	mg/L	N		NR	U	DR	42	d	NR	NR	LC	F	C	CHM	HMGL	BL	400		N	0.32	N	0.0355	33.1		10	5	5	10	5	1	4	1	10	4	55
391	2780	Murphy et al., 1995	Lead chloride	74.5	Rat (*Rattus norvegicus*)	2	0/400	mg/L	N		ADL	U	DR	30	d	NR	NR	LC	F	C	GRO	BDWT	WO	400		N	0.32	N	0.0355	33.1		10	5	5	10	5	8	4	1	10	4	62
392	2682	Hasan et al., 1989	Lead chloride	74.5	Rat (*Rattus norvegicus*)	2	0/400	mg/L	N		NR	U	DR	42	d	NR	NR	LC	F	C	GRS	BDWT	WO	400		N	0.32	N	0.0355	33.1		10	5	5	10	5	4	4	1	10	4	58
393	2737	Kimmel et al., 1980	Lead acetate	100	Rat (*Rattus norvegicus*)	5	0/0.09/0.92/9.1/45	mg/kg bw/d	N		ADL	U	DR	10	w	21	d	JV	F	V	FDB	FCNS	WO	45.0		Y	0.29	N	0.03249	45.0		10	5	5	5	10	4	4	1	10	4	58
394	617	Nation et al., 1990	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/500	mg/kg diet	N		ADL	U	FD	61	d	50	d	JV	M	C	GRO	BDWT	WO	500		Y	0.2	N	0.0183	45.7		10	10	5	5	6	8	4	1	10	4	63
395	10087	Amin et al, 1993	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/0.2/0.5	mg/ml	N		ADL	U	DR	75	d	NR	NR	AD	M	C	FDB	FCNS	WO	0.500		Y	0.197	N	0.02294	58.2		10	5	5	5	6	4	4	6	10	4	59
396	10087	Amin et al, 1993	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/0.2/0.5	mg/ml	N		ADL	U	DR	90	d	21	d	JV	M	C	GRO	BDWT	WO	0.500		Y	0.197	N	0.02294	58.2		10	5	5	10	6	8	4	3	10	4	65
397	2768	McGivern et al., 1991	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/550	mg/L	N		ADL	U	DR	7	d	NR	NR	GE	F	V	GRS	BDWT	WO	550		N	0.35	N	0.03849	60.5		10	5	5	5	5	4	4	1	10	4	53
398	2768	McGivern et al., 1991	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/550	mg/L	N		ADL	U	DR	7	d	NR	NR	GE	F	V	REP	RSUC	WO	550		N	0.35	N	0.03849	60.5		10	5	5	5	5	10	4	3	10	4	61
399	2525	Barrett and Livesey, 1982	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/1	g/L	N		ADL	U	DR	16	d	NR	NR	LC	F	V	FDB	WCON	WO	1.00		N	0.297	N	0.0332	61.0		10	5	5	5	5	4	4	1	10	4	53
400	2525	Barrett and Livesey, 1982	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/1	g/L	N		ADL	U	DR	16	d	NR	NR	LC	F	V	REP	PRWT	WO	1.00		N	0.297	N	0.0332	61.0		10	5	5	5	5	10	4	1	10	4	59
401	2565	Carpenter, 1982	Lead acetate	100	Hamster (*Mesocricetus auratus*)	2	0/547	mg/L	N		ADL	U	DR	51	d	15	w	GE	F	C	GRO	BDWT	WO	547		Y	0.167	N	0.0198	64.8		10	5	5	5	6	8	4	3	10	4	60
402	2565	Carpenter, 1982	Lead acetate	100	Hamster (*Mesocricetus auratus*)	2	0/547	mg/L	N		ADL	U	DR	51	d	15	w	GE	F	C	HIS	GHIS	KI	547		Y	0.167	N	0.0198	64.8		10	5	5	5	6	4	4	1	10	4	54
403	2565	Carpenter, 1982	Lead acetate	100	Hamster (*Mesocricetus auratus*)	2	0/547	mg/L	N		ADL	U	DR	14	d	11	w	GE	F	C	GRO	BDWT	WO	547		Y	0.163	N	0.0193	64.9		10	5	5	10	6	8	4	3	10	4	65
404	2565	Carpenter, 1982	Lead acetate	100	Hamster (*Mesocricetus auratus*)	2	0/547	mg/L	N		ADL	U	DR	14	d	11	w	GE	F	C	HIS	GHIS	KI	547		Y	0.163	N	0.0193	64.9		10	5	5	10	6	4	4	1	10	4	59
405	2732	Kempings et. al 1988	Lead acetate	54.61	Rat (*Rattus norvegicus*)	3	0/0.5/1.0	g/L	N		ADL	U	DR	90	d	NR	NR	JV	M	C	FDB	FCNS	WO	1.00		Y	0.12	N	0.01469	66.8		10	5	5	5	6	4	4	1	10	4	54
406	2732	Kempings et. al 1988	Lead acetate	54.61	Rat (*Rattus norvegicus*)	3	0/0.5/1.0	g/L	N		ADL	U	DR	90	d	NR	NR	LC	M	C	GRO	BDWT	WO	1.00		Y	0.12	N	0.01469	66.8		10	5	5	5	6	8	4	1	10	4	58
407	2732	Kempings et. al 1988	Lead acetate	54.61	Rat (*Rattus norvegicus*)	3	0/0.5/1.0	g/L	N		ADL	U	DR	90	d	NR	NR	JV	M	C	ORW	ORWT	MT	1.00		Y	0.12	N	0.01469	66.8		10	5	5	5	6	4	4	1	10	4	54
408	25903	Sokol, et al, 2002	Lead acetate	54.61	Rat (*Rattus norvegicus*)	5	0/0.025/0.05/0.1/0.3	% in water	N		ADL	U	DR	16	w	100	d	AD	M	C	HRM	LUHO	SR	0.300		Y	0.661	Y	0.02758	68.4		10	5	5	5	7	1	4	3	6	4	50
409	25903	Sokol, et al, 2002	Lead acetate	54.61	Rat (*Rattus norvegicus*)	5	0/0.025/0.05/0.1/0.3	% in water	N		ADL	U	DR	16	w	100	d	AD	M	C	GRS	BDWT	WO	0.300		Y	0.661	Y	0.02758	68.4		10	5	5	5	7	4	4	10	6	4	60
410	2577	Cory-Slechta and Thompson, 1979	Lead acetate	54.61	Rat (*Rattus norvegicus*)	4	0/50/300/1000	mg/L	N		DLY	U	DR	125	d	NR	NR	GE	M	C	GRO	BDWT	WO	1000		Y	0.045	N	0.00607	73.7		10	5	5	5	6	8	4	1	10	4	58
411	11831	Jessup and Shott, 1969	Lead acetate	100	Rat (*Rattus norvegicus*)	5	0/10/50/100/1000	mg/kg diet	N		ADL	U	FD	18	mo	21	d	JV	B	C	PHY	GPHY	BL	1000		Y	0.637	N	0.04742	74.4		10	10	5	5	6	4	4	1	10	4	59
412	11831	Jessup and Shott, 1969	Lead acetate	100	Rat (*Rattus norvegicus*)	5	0/10/50/100/1000	mg/kg diet	N		ADL	U	FD	92	w	21	d	JV	B	C	FDB	FCNS	WO	1000		Y	0.615	N	0.04607	74.9		10	10	5	5	6	4	4	1	10	4	59
413	11831	Jessup and Shott, 1969	Lead acetate	100	Rat (*Rattus norvegicus*)	5	0/10/50/100/1000	mg/kg diet	N		ADL	U	FD	92	w	21	d	JV	B	C	GRO	BDWT	WO	1000		Y	0.615	N	0.04607	74.9		10	10	5	5	6	8	4	1	10	4	63
414	2598	Donald et al., 1981	Lead acetate	54.61	Mouse (*Mus musculus*)	2	0/0.13	% in water	N		DLY	U	DR	39	d	NR	NR	GE	F	C	FDB	WCON	WO	0.130		N	0.325	N	0.0360	78.6		10	5	5	5	5	4	4	1	10	4	53
415	2598	Donald et al., 1981	Lead acetate	54.61	Mouse (*Mus musculus*)	2	0/0.13	% in water	N		DLY	U	DR	39	d	NR	NR	GE	F	C	GRO	BDWT	WO	0.130		N	0.325	N	0.0360	78.6		10	5	5	5	5	8	4	1	10	4	57
416	2598	Donald et al., 1981	Lead acetate	54.61	Mouse (*Mus musculus*)	2	0/0.13	% in water	N		DLY	U	DR	21	d	NR	NR	GE	F	C	REP	PROG	WO	0.130		N	0.325	N	0.0360	78.6		10	5	5	5	5	10	4	1	10	4	59

Appendix 6.1 Mammalian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
Lead

Ref			Exposure																					Effects					Conversion to mg/kg bw/day				Result		Data Evaluation Score											
Result #	Ref N.		Chemical Form	MW%	Test Species	# of Conc/ Doses	Conc/ Doses	Conc/Dose Units	Wet Weight Reported?	Percent Moisture	Application Frequency	Method of Analyses	Route of Exposure	Exposure Duration	Duration Units	Age	Age Units	Lifestage	Sex		Control Type	Effect Type	Effect Measure	Response Site	Study NOAEL	Study LOAEL		Body Weight Reported?	Body Weight in kg	Ingestion Rate Reported?	Ingestion Rate in kg or L/day	NOAEL Dose (mg/kg/day)	LOAEL Dose (mg/kg/day)		Data Source	Dose Route	Test Concentrations	Chemical form	Dose Quantification	Endpoint	Dose Range	Statistical Power	Exposure Duration	Test Conditions	Total
417	2721	Jessup, 1969	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/10/100/1000	mg/kg diet	N		ADL	U	FD	8	w	NR	NR	GE	B		C	FDB	FCNS	WO	1000			Y	0.46	N	0.0363	78.8			10	10	5	5	6	4	4	1	10	4	59
418	2721	Jessup, 1969	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/10/100/1000	mg/kg diet	N		ADL	U	FD	8	w	NR	NR	GE	B		C	GRO	BDWT	WO	1000			Y	0.46	N	0.0363	78.8			10	10	5	5	6	8	4	1	10	4	63
419	2721	Jessup, 1969	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/10/100/1000	mg/kg diet	N		ADL	U	FD	14	w	NR	NR	GE	F		C	REP	FERT	NR	1000			Y	0.255	N	0.0223	87.6			10	10	5	5	6	10	4	1	10	4	65
420	2743	Kristensen et al., 1995	Lead chloride	100	Mouse (*Mus musculus*)	2	0/0.75	g/L	N		ADL	U	DR	6	w	9	w	JV	F		C	GRO	BDWT	WO	0.750			Y	0.0365	N	0.00503	103			10	5	5	10	6	8	4	1	10	4	63
421	2502	Wolfe et al, 1996	Lead acetate trihydrate	100	Rat (*Rattus norvegicus*)	5	0/0.78/20.64/41.24/103.63	mg/kg bw/d	N		ADL	M	DR	24	w	94	d	JV	M		C	HRM	TSTR	BL	104			Y	0.75394	Y	0.026	104			10	5	10	5	10	1	4	3	10	4	62
422	14709	Zirkin et al., 1985	Lead acetate	54.61	Rat (*Rattus norvegicus*)	6	0/500/1000/2000/4000/8000	mg/L	N		NR	U	DR	130	d	40	d	JV	M		C	HRM	TSTR	BL	2000	4000		N	0.51	N	0.05401	116	231		10	5	5	5	5	1	10	10	10	4	65
423	2671	Hamilton et al., 1994	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/250/500/1000	mg/L	N		ADL	U	DR	77	d	25	d	GE	F		V	CHM	PHOS	SR	1000			N	0.202	N	0.02346	116			10	5	5	5	5	1	4	10	10	4	59
424	2671	Hamilton et al., 1994	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/250/500/1000	mg/L	N		ADL	U	DR	77	d	25	d	GE	F		V	FDB	FCNS	WO	1000			N	0.202	N	0.02346	116			10	5	5	5	5	4	4	10	10	4	62
425	14799	Goyer et al., 1970	Lead acetate	100	Rat (*Rattus norvegicus*)	6	0/2.3/7.0/12/21/67/220	mg/org/d	N		NR	U	DR	10	w	NR	NR	JV	M		C	CHM	RETI	BL	21.0	67.0		Y	0.175	N	0.02062	120	383		10	5	5	5	6	1	8	10	10	4	64
426	14802	Hejtmancik, et. al, 1982	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/0.2	% in water	N		ADL	U	DR	21	d	NR	NR	JV	F		C	FDB	WCON	WO	0.200			N	0.317	N	0.0352	121			10	5	5	5	5	4	4	1	10	4	53
427	14802	Hejtmancik, et. al, 1982	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/0.2	% in water	N		ADL	U	DR	21	d	NR	NR	LC	F		C	REP	PRWT	WO	0.200			N	0.317	N	0.0352	121			10	5	5	5	5	10	4	1	10	4	59
428	2723	Johansson and Wide, 1986	Lead chloride	100	Mouse (*Mus musculus*)	2	0/1	g/L	N		ADL	U	DR	12	w	9	w	SM	M		C	HRM	TSTR	WO	1.00			Y	0.0334	N	0.00465	139			10	5	5	10	6	1	4	3	10	4	58
429	14825	Govoni et al, 1980	Lead acetate	54.61	Rat (*Rattus norvegicus*)	3	0/0.04/2.5	g/L	N		DLY	U	DR	20	d	60	d	JV	F		V	REP	PRWT	WO	2.50			N	0.35	N	0.03849	150			10	5	5	5	5	10	4	6	10	4	64
430	2548	Brown, 1974	Lead acetate	54.61	Rabbit (*Oryctolagus cuniculus*)	2	0/5000	mg/kg diet	N		ADL	U	FD	23	mo	NR	NR	AD	B		C	PHY	GPHY	EY	5000			Y	3.2	N	0.17873	153			10	10	5	5	6	4	4	6	10	4	64
431	2770	McMurry et al., 1995	Lead acetate	100	Cotton rat (*Sigmodon hispidus*)	3	0/2.1/28.8	mg/org	N		ADL	U	DR	7	w	NR	NR	AD	M		C	FDB	WCON	WO	28.8			Y	0.1698	N	na	170			10	5	5	5	6	4	4	10	6	4	59
432	2770	McMurry et al., 1995	Lead acetate	100	Cotton rat (*Sigmodon hispidus*)	3	0/2.1/28.8	mg/org	N		ADL	U	DR	7	w	NR	NR	AD	M		C	MOR	MORT	WO	28.8			Y	0.1698	N	na	170			10	5	5	5	6	9	4	10	6	4	64
433	2770	McMurry et al., 1995	Lead acetate	100	Cotton rat (*Sigmodon hispidus*)	3	0/2.2/30.4	mg/org	N		ADL	U	DR	13	w	NR	NR	AD	M		C	FDB	WCON	WO	30.4			Y	0.1698	N	na	179			10	5	5	5	6	4	4	10	6	4	59
434	14376	Hsu et al, 1975	Lead acetate	100	Pig (*Sus scrofa*)	2	0/1000	mg/kg diet	N		ADL	U	FD	13	w	4	w	JV	NR	NR	FDB	FCNS	WO	1000			Y	7.5	Y	1.296	173			10	10	5	5	7	4	4	3	10	4	62
435	2770	McMurry et al., 1995	Lead acetate	100	Cotton rat (*Sigmodon hispidus*)	3	0/2.2/30.4	mg/org	N		ADL	U	DR	13	w	NR	NR	AD	M		C	MOR	MORT	WO	30.4			Y	0.1698	N	na	179			10	5	5	5	6	9	4	10	6	4	64
436	2770	McMurry et al., 1995	Lead acetate	100	Cotton rat (*Sigmodon hispidus*)	3	0/2.2/30.4	mg/org	N		ADL	U	DR	13	w	NR	NR	AD	M		C	REP	TEWT	TE	30.4			Y	0.1698	N	na	179			10	5	5	5	6	10	4	3	6	4	58
437	814	Koller and Roan, 1977	Lead acetate	100	Mouse (*Mus musculus*)	4	0/13/130/1300	mg/L	N		NR	U	DR	70	d	28	d	JV	NR		C	ENZ	ACPH	MT	1300			Y	0.024	N	0.00345	187			10	5	5	5	6	1	4	1	10	4	51
438	814	Koller and Roan, 1977	Lead acetate	100	Mouse (*Mus musculus*)	4	0/13/130/1300	mg/L	N		NR	U	DR	70	d	28	d	JV	NR		C	GRO	BDWT	WO	1300			Y	0.024	N	0.00345	187			10	5	5	5	6	8	4	1	10	4	58
439	2924	Wadi and Ahmad, 1999	Lead acetate	54.61	Mouse (*Mus musculus*)	3	0/0.25/0.5	% in water	N		ADL	U	DR	6	w	7	w	SM	M		C	FDB	FCNS	WO	0.250	0.500		Y	0.0398	N	0.00544	187	373		10	5	5	5	6	4	10	10	6	4	65
440	2886	Sokol, 1987	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/3000	mg/L	N		ADL	U	DR	30	d	52	d	JV	M		C	FDB	WCON	WO	3000			N	0.217	N	0.02503	189			10	5	5	5	5	4	4	1	10	4	53
441	2886	Sokol, 1987	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/3000	mg/L	N		ADL	U	DR	30	d	52	d	JV	M		C	HRM	TSTR	BL	3000			N	0.217	N	0.02503	189			10	5	5	5	5	1	4	3	10	4	52
442	2886	Sokol, 1987	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/3000	mg/L	N		ADL	U	DR	30	d	52	d	JV	M		C	GRO	BDWT	WO	3000			N	0.217	N	0.02503	189			10	5	5	5	5	8	4	1	10	4	57
443	2669	Hallen et al., 1995	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg bw	N		NR	U	DR	13	w	NR	NR	GE	F		C	CHM	PRTL	MK	200			Y	0.2	N	0.02326	200			10	5	5	5	10	1	4	10	10	4	64
444	2669	Hallen et al., 1995	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg bw	N		NR	U	DR	13	w	NR	NR	GE	F		C	GRO	BDWT	WO	200			Y	0.2	N	0.02326	200			10	5	5	5	10	8	4	1	10	4	62
445	2848	Ronis, et. al., 1998	Lead acetate	54.61	Rat (*Rattus norvegicus*)	4	0/0.05/0.15/0.45	% in water	N		ADL	U	DR	37	d	NR	NR	AD	F		C	FDB	FCNS	WO	0.450			N	0.35	N	0.03849	270			10	5	5	5	5	4	4	1	10	4	53
446	2785	Nathan et al., 1992	Lead acetate	54.61	Rat (*Rattus norvegicus*)	5	0/0.05/0.1/0.5/1	% in water	N		ADL	U	DR	10	w	NR	NR	AD	M		C	GRS	BDWT	WO	0.500	1.00		Y	0.439	N	0.04719	294	587		10	5	5	5	6	4	10	10	6	4	65
447	14797	Pinon-Lataillade, et.al, 1993	Lead acetate trihydrate	100	Rat (*Rattus norvegicus*)	2	0/0.3	% in water	N		NR	U	DR	70	d	30	d	LC	M		C	HRM	TSTR	TE	0.300			Y	0.495	N	0.05258	319			10	5	5	5	6	1	4	3	3	4	46
448	14797	Pinon-Lataillade, et.al, 1993	Lead acetate trihydrate	100	Rat (*Rattus norvegicus*)	2	0/0.3	% in water	N		NR	U	DR	70	d	90	d	AD	M		C	GRS	BDWT	WO	0.300			Y	0.495	N	0.05258	319			10	5	5	5	6	4	4	10	3	4	56
449	14797	Pinon-Lataillade, et.al, 1993	Lead acetate trihydrate	100	Rat (*Rattus norvegicus*)	2	0/0.3	% in water	N		NR	U	DR	70	d	90	d	AD	M		C	REP	SPCL	TE	0.300			Y	0.495	N	0.05258	319			10	5	5	5	6	10	4	10	3	4	62
450	2923	Vyskocil et al., 1995	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/81.3/320	mg/kg bw/d	N		ADL	U	DR	2	mo	9-10	w	SM	F		C	GRO	BDWT	WO	320			N	0.25	N	0.02843	320			10	5	5	5	10	8	4	1	10	4	62
451	2846	Ronis et al., 1996	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/6000	mg/L	N		ADL	U	DR	14	d	60	d	SM	M		C	REP	TEWT	TE	6000			Y	0.333	N	0.0368	362			10	5	5	5	6	10	4	6	3	4	58
452	2846	Ronis et al., 1996	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/6000	mg/L	N		ADL	U	DR	24	d	24	d	JV	F		C	GRO	BDWT	WO	6000			Y	0.24	N	0.0274	374			10	5	5	5	6	8	4	10	3	4	60
453	3718	Donovick and Burright, 1986	Lead acetate	54.61	Mouse (*Mus musculus*)	2	0/0.5	% in water	N		ADL	U	DR	4	w	75	d	JV	M		C	BEH	ACTV	WO	0.500			Y	0.0369	N	0.00508	376			10	5	5	5	6	4	4	1	3	4	47
454	3718	Donovick and Burright, 1986	Lead acetate	54.61	Mouse (*Mus musculus*)	2	0/0.5	% in water	N		ADL	U	DR	22	d	7	w	SM	M		C	GRO	BDWT	WO	5000			Y	0.0369	N	0.00508	376			10	5	5	5	6	8	4	1	3	4	51
455	3718	Donovick and Burright, 1986	Lead acetate	54.61	Mouse (*Mus musculus*)	2	0/0.5	% in water	N		ADL	U	DR	4	w	220	d	SM	M		C	GRS	BDWT	WO	0.500			Y	0.0345	N	0.00478	379			10	5	5	5	6	4	4	1	3	4	47
456	2799	Ogilvie and Martin, 1981	Lead acetate	100	Mouse (*Mus musculus*)	2	0/2732	mg/L	N		NR	U	DR	10	mo	NR	NR	AD	M		C	GRO	BDWT	WO	2732			Y	0.034	N	0.00472	379			10	5	5	5	6	8	4	1	10	4	58
457	2821	Pinon-Lataillade et al., 1995	Lead acetate	54.61	Mouse (*Mus musculus*)	2	0/0.5	% in water	N		ADL	U	DR	44	d	NR	NR	SM	M		C	HRM	TEST	PL	0.500			N	0.0375	N	0.00515	381			10	5	5	5	5	1	4	3	10	4	52
458	3718	Donovick and Burright, 1986	Lead acetate	54.61	Mouse (*Mus musculus*)	2	0/0.5	% in water	N		ADL	U	DR	22	d	220	d	SM	M		C	GRO	BDWT	WO	0.500			Y	0.0315	N	0.00441	382			10	5	5	5	6	8	4	1	10	4	58
459	2924	Wadi and Ahmad, 1999	Lead acetate	54.61	Mouse (*Mus musculus*)	3	0/0.25/0.5	% in water	N		ADL	U	DR	6	w	7	w	SM	M		C	HRM	TSTR	PL	0.500			Y	0.03148	N	0.0044	382			10	5	5	5	6	1	4	10	6	4	56
460	2836	Rasile et. al. 1995	Lead acetate	54.61	Mouse (*Mus musculus*)	2	0/0.5	% in water	N		ADL	U	DR	45	d	50-100	d	GE	F		C	BEH	ACTV	WO	0.500			Y	0.018	N	0.00266	404			10	5	5	5	6	4	4	1	10	4	54
461	2597	Donald et al., 1987	Lead acetate	54.61	Mouse (*Mus musculus*)	2	0/0.25	% in water	N		ADL	U	DR	47	d	NR	NR	GE	F		C	FDB	FCNS	WO	0.250			Y	0.035	Y	0.0112	437			10	5	5	5	7	4	4	8	3	4	55
462	14709	Zirkin et al., 1985	Lead acetate	54.61	Rat (*Rattus norvegicus*)	6	0/500/1000/2000/4000/8000	mg/L	N		NR	U	DR	130	d	NR	NR	AD	M		C	REP	FERT	WO	8000			N	0.51	N	0.05401	463			10	5	5	5	5	10	4	1	10	4	59
463	14818	Ewers and Erbe, 1980	Lead acetate	54.61	Rat (*Rattus norvegicus*)	4	0/1500/4000/10000	mg/kg diet	N		ADL	U	FD	120	d	2	d	JV	F		C	CHM	TOPR	BR	10000			Y	0.24	N	0.02126	484			10	10	5	5	6	1	4	8	10	4	63
464	2785	Nathan et al., 1992	Lead acetate	54.61	Rat (*Rattus norvegicus*)	5	0/0.05/0.1/0.5/1	% in water	N		ADL	U	DR	10	w	NR	NR	AD	M		C	HRM	TSTR	BL	1.00			Y	0.503	N	0.05334	579			10	5	5	5	6	1	4	10	6	4	56
465	2760	Marchlewicz et al., 1993	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/1	% in water	N		ADL	U	DR	9	mo	3	mo	SM	M		M	FDB	WCON	WO	1.00			Y	0.5	N	0.05305	579			10	5	5	5	6	4	4	1	10	4	54
466	2760	Marchlewicz et al., 1993	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/1	% in water	N		ADL	U	DR	9	mo	3	mo	SM	M		M	GRO	BDWT	WO	1.00			Y	0.5	N	0.05305	579			10	5	5	5	6	8	4	1	10	4	58
467	2816	Piasecka et. al. 1995	Lead acetate trihydrate	54.61	Rat (*Rattus norvegicus*)	2	0/1	% in water	N		ADL	U	DR	9	mo	NR	NR	SM	M		C	FDB	FCNS	WO	1.00			N	0.35	N	0.03849	600			10	5	5	5	5	4	4	1	10	4	53
468	14751	Piasek et al, 1988	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/5500	mg/L	N		ADL	U	DR	6	w	14	w	LC	F		C	PHY	BLPR	BL	5500			Y	0.2045	N	0.02373	638			10	5	5	5	6	4	4	10	10	4	63
469	2817	Piasekand Kostial, 1987	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/216/420/639.36	mg/kg bw/d	N		ADL	U	DR	18	w	NR	NR	JV	M		C	GRO	BDWT	WO	639			N	0.25	Y	0.04	639			10	5	5	5	10	8	4	1	10	4	62

Appendix 6.1 Mammalian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
Lead

Ref			Exposure																				Effects					Conversion to mg/kg bw/day				Result		Data Evaluation Score											
Result #	Ref N.		Chemical Form	MW%	Test Species	# of Conc/ Doses	Conc/ Doses	Conc/Dose Units	Wet Weight Reported?	Percent Moisture	Application Frequency	Method of Analyses	Route of Exposure	Exposure Duration	Duration Units	Age	Age Units	Lifestage	Sex	Control Type	Effect Type	Effect Measure	Response Site	Study NOAEL	Study LOAEL	Body Weight Reported?	Body Weight in kg	Ingestion Rate Reported?	Ingestion Rate in kg or L/day	NOAEL Dose (mg/kg/day)	LOAEL Dose (mg/kg/day)	Data Source	Dose Route	Test Concentrations	Chemical form	Dose Quantification	Endpoint	Dose Range	Statistical Power	Exposure Duration	Test Conditions	Total
470	14752	Piasek and Kostial, 1990	Lead acetate	100	Rat (*Rattus norvegicus*)	4	0/1500/3500/5500	mg/L	N		ADL	U	DR	6	w	15	w	LC	B	C	PHY	BLPR	BL	5500		Y	0.185	N	0.02168	645		10	5	5	5	6	4	4	10	10	4	63
471	2505	Lamb et al., 1997	Lead acetate trihydrate	100	Mouse (*Mus musculus*)	2	0/0.67	g/kg bw/d	N		ADL	U	DR	105	d	6	w	JV	B	C	GRO	BDWT	WO	0.670		Y	0.0376	N	0.00517	670		10	5	5	5	10	8	4	1	10	4	62
472	2505	Lamb et al., 1997	Lead acetate trihydrate	100	Mouse (*Mus musculus*)	2	0/0.67	g/kg bw/d	N		ADL	U	DR	105	d	6	w	JV	B	C	ORW	ORWT	LI	0.670		Y	0.0376	N	0.00517	670		10	5	5	5	10	4	4	1	10	4	58
473	2818	Piasek and Kostial 1991	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/750	mg/kg bw/d	N		NR	U	DR	20	w	10	w	GE	F	C	MOR	MORT	WO	750		Y	0.2681	N	0.03028	750		10	5	5	5	10	9	4	1	10	4	63
474	3749	Ogilvie, 1977	Lead acetate	54.61	Mouse (*Mus musculus*)	2	0/10	mg/ml	N		NR	U	DR	2	w	NR	NR	AD	M	C	MOR	MORT	WO	10.0		Y	0.0328	N	0.00457	761		10	5	5	5	6	9	4	1	3	4	52
475	2523	Barlow et al., 1977	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/2	% in diet	N		ADL	U	FD	21	d	NR	NR	LC	F	C	ORW	ORWT	BR	2.00		N	0.21	N	0.01905	991		10	10	5	5	5	4	4	1	10	4	58
476	2505	Lamb et al., 1997	Lead acetate trihydrate	100	Mouse (*Mus musculus*)	4	0/0.67/1.00/1.50	g/kg bw/d	N		ADL	U	DR	105	d	6	w	JV	B	C	FDB	WCON	WO	1.50		Y	0.0376	N	0.00517	1500		10	5	5	5	10	4	4	1	10	4	58
477	2698	Holtzman et al., 1981	Lead carbonate	77.55	Rat (*Rattus norvegicus*)	2	0/4	% in diet	N		ADL	U	FD	8	w	60-80	d	JV	M	C	ITX	PARL	LG	4.00		N	0.523	N	0.04032	2390		10	10	5	10	5	4	4	1	10	4	63
478	2781	Murthyet al., 1991	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/4.78	mg/org/d	N		ADL	U	DR	70	d	NR	NR	JV	M	C	FDB	FCNS	WO	250		Y	0.045	N	0.00607	5560		10	5	5	5	6	4	4	1	10	4	54
479	2781	Murthy et al., 1991	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/4.78	mg/org/d	N		ADL	U	DR	70	d	NR	NR	JV	M	C	GRO	BDWT	WO	250		Y	0.045	Y	0.0061	5560		10	5	5	5	7	8	4	1	10	4	59
480	2781	Murthyet al., 1991	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/4.78	mg/org/d	N		ADL	U	DR	70	d	NR	NR	JV	M	C	REP	TEDG	TE	250		Y	0.045	N	0.00607	5560		10	5	5	5	6	10	4	1	10	4	60
481	2694	Hilderbrand et al., 1973	Lead acetate	54.61	Rat (*Rattus norvegicus*)	3	0/5/100	ug/org/d	N		DLY	U	OR	30	d	NR	NR	SM	M	C	BEH	INST	WO		5.00	Y	0.245	N	0.02162		0.0111	10	8	5	5	6	4	4	10	3	4	59
482	2694	Hilderbrand et al., 1973	Lead acetate	54.61	Rat (*Rattus norvegicus*)	3	0/5/100	ug/org/d	N		DLY	U	OR	30	d	NR	NR	LC	M	C	CHM	ASCA	UR		5.00	Y	0.245	N	0.02162		0.0111	10	8	5	5	6	1	4	10	3	4	56
483	2694	Hilderbrand et al., 1973	Lead acetate	54.61	Rat (*Rattus norvegicus*)	3	0/5/100	ug/org/d	N		DLY	U	OR	30	d	24	d	JV	M	C	REP	TEWT	PG		5.00	Y	0.245	N	0.02162		0.0111	10	8	5	5	6	10	4	10	3	4	65
484	14697	USEPA, 1980	Lead	100	Rat (*Rattus norvegicus*)	3	0/5/50	mg/l	N		NR	U	DR	40	d	40	d	JV	M	C	BEH	ACTV	WO		5.00	N	0.217	N	0.02503		0.577	10	5	5	4	5	4	4	10	10	4	61
485	14697	USEPA, 1980	Lead	100	Rat (*Rattus norvegicus*)	3	0/5/50	mg/L	N		NR	U	DR	40	d	NR	NR	AD	M	C	CHM	5HAA	BR		5.00	N	0.217	N	0.02503		0.577	10	5	5	4	5	1	4	10	10	4	58
486	2654	Gonzalez-Riola et al., 1997	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/17	mg/kg diet	N		ADL	U	FD	50	d	21	d	GE	F	C	GRO	BDWT	WO		17.0	Y	0.2756	N	0.02382		0.802	10	10	5	5	6	8	4	10	3	4	65
487	2616	Escribano et al., 1997	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/17	mg/kg diet	N		NR	U	FD	50	d	50	d	AD	F	C	MPH	GMPH	WO		17.0	Y	0.2756	N	0.02382		0.802	10	10	5	5	6	8	4	10	3	4	65
488	2905	Tafelski and Lamperti, 1975	Lead acetate	54.61	Rat (*Rattus norvegicus*)	4	0/1/5/10	mg/org	N		DLY	U	GV	29	d	NR	NR	SM	F	C	ENZ	ALAD	BL		1.00	Y	0.283	N	0.02434		1.93	10	8	10	5	6	1	4	10	6	4	64
489	2930	Wiebe and Barr, 1988	Lead chloride	100	Rat (*Rattus norvegicus*)	3	0/20/200	mg/L	N		NR	U	DR	14	d	21	d	JV	F	C	HRM	ESDL	UT		20.0	Y	0.1228	N	0.0150		2.44	10	5	5	10	6	1	4	10	10	4	65
490	2763	Maxfield et al., 1975	Lead acetate	100	Dog (*Canis familiaris*)	2	0/2.5	mg/kg bw/d	N		NR	U	FD	76	w	<1	yr	JV	B	C	ENZ	ALAD	BL		2.50	N	14	N	0.60128		2.50	10	10	5	5	10	1	4	10	6	4	65
491	2889	Sourgens et al., 1987	Lead acetate trihydrate	54.61	Rat (*Rattus norvegicus*)	4	0/45/900/4580	mg/L	N		ADL	U	DR	30	d	NR	NR	JV	F	C	HRM	Other	PI		45	Y	0.156	N	0.0186		2.92	10	5	5	5	6	1	4	10	6	4	56
492	2716	Jadhav and Ramesh, 1997	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/50	mg/L	N		NR	U	DR	30	d	21	d	JV	M	C	CHM	TYRO	BR		50	N	0.248	N	0.02823		3.11	10	5	5	5	5	1	4	10	10	7	62
493	2577	Cory-Slecthta and Thompson, 1979	Lead acetate	54.61	Rat (*Rattus norvegicus*)	4	0/50/300/1000	mg/L	N		DLY	U	DR	125	d	21	d	JV	M	C	BEH	ACTP	WO		50	Y	0.045	N	0.00607		3.69	10	5	5	5	6	4	4	10	10	4	63
494	2876	Sierra and Tiffany-Castiglioni, 1992	Lead acetate	100	Guinea pig (*Cavia porcellus*)	3	0/5.5/11.0	mg/kg bw/d	N		DLY	U	DR	30	d	NR	NR	GE	F	C	HRM	HRMN	SR		5.5	Y	1.0	N	0.099		5.50	10	5	5	5	10	1	4	10	10	4	64
495	2944	Zheng et al., 1996	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/50/250	mg/L	N		ADL	U	DR	30	d	22-24	d	GE	M	C	CHM	PRTL	BR		50	Y	0.27	N	0.03047		5.64	10	5	5	5	6	1	4	10	10	4	60
496	2756	Mahaffey et al., 1973	Lead acetate	100	Rat (*Rattus norvegicus*)	7	0/0.19/0.70/2.8/5.9/12.9/24.3	mg/kg bw/d	N		NR	U	DR	10	w	NR	NR	JV	M	C	PHY	EXCR	UR		5.9	Y	0.337	N	0.0372		5.90	10	5	5	5	10	1	4	10	10	4	64
497	3838	Cory-Slechta et al., 1981	Lead acetate	54.61	Rat (*Rattus norvegicus*)	3	0/100/300	mg/L	N		NR	U	DR	74	d	NR	d	GE	M	C	FDB	FDNG	WO		100	Y	0.32	N	0.0355		6.06	10	5	5	5	6	4	4	10	10	4	63
498	2640	Freundt and Ibrahim, 1990	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/100	mg/L	N		ADL	U	DR	91	d	0	d	JV	F	C	FDB	WCON	WO		100	Y	0.295	N	0.033		6.11	10	5	5	5	6	4	4	10	10	4	63
499	3821	Boscolo et al., 1988	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/0.06	mg/ml	N		ADL	U	DR	18	mo	NR	NR	JV	M	C	PHY	BLPR	HE		0.0600	N	0.267	N	0.03016		6.78	10	5	5	5	5	4	4	10	10	4	62
500	2830	Rader et al., 1981	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/9.1	mg/kg bw/d	N		1 per w	U	OR	6	w	NR	NR	JV	M	C	ENZ	ALAD	UR		9.10	Y	0.475	N	0.03726		9.10	10	8	5	5	10	1	4	10	3	4	60
501	2830	Rader et al., 1981	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/9.1	mg/kg bw/d	N		1 per w	U	OR	6	w	NR	NR	AD	M	C	ORW	ORWT	KI		9.10	Y	0.475	N	0.03726		9.10	10	8	5	5	10	4	4	10	3	4	63
502	2830	Rader et al., 1981	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/9.3	mg/kg bw/d	N		ADL	U	DR	6	w	NR	NR	JV	M	C	ENZ	ALAD	UR		9.30	Y	0.468	N	0.04999		9.30	10	5	5	5	10	1	4	10	3	4	57
503	2830	Rader et al., 1981	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/9.3	mg/kg bw/d	N		ADL	U	DR	6	w	NR	NR	JV	M	C	ORW	ORWT	KI		9.30	Y	0.468	N	0.04999		9.30	10	5	5	5	10	4	4	10	3	4	60
504	2788	Nehru et al., 1997	Lead	100	Rat (*Rattus norvegicus*)	2	0/20	mg/kg bw	N		EOD	U	GV	8	w	NR	NR	JV	F	C	CHM	PRTL	BR		10.0	Y	0.18125	N	0.01688		10.0	10	8	10	4	10	1	4	10	3	4	64
505	2660	Gruber et al., 1997	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/100/5000	mg/L	N		DLY	U	DR	3	mo	NR	NR	AD	M	C	HIS	GHIS	BO		100	Y	0.5555	N	0.05832		10.5	10	5	5	5	6	4	4	10	10	4	63
506	21143	El-Gazzar et al, 1978	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/100	mg/L	N		NR	U	DR	140	d	21	d	JV	M	C	ENZ	ALAD	UR		100	Y	0.443	N	0.04758		10.7	10	5	5	5	6	1	4	10	10	4	60
507	2660	Gruber et al., 1997	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/100/5000	mg/L	N		DLY	U	DR	1	mo	NR	NR	AD	M	C	PHY	GPHY	BL		100	Y	0.4045	N	0.04384		10.8	10	5	5	5	6	4	4	10	10	4	63
508	2770	McMurry et al., 1995	Lead acetate	100	Cotton rat (*Sigmodon hispidus*)	3	0/2.1/28.8	mg/org	N		ADL	U	DR	7	w	NR	NR	AD	M	C	CHM	NEUT	BL		2.10	Y	0.1698	N	na		12.4	10	5	5	5	6	1	4	10	6	4	56
509	2770	McMurry et al., 1995	Lead acetate	100	Cotton rat (*Sigmodon hispidus*)	3	0/2.1/28.8	mg/org	N		ADL	U	DR	7	w	NR	NR	AD	M	C	ORW	SMIX	LI		2.10	Y	0.1698	N	na		12.4	10	5	5	5	6	4	4	10	6	4	59
510	25903	Sokol, et al, 2002	Lead acetate	54.61	Rat (*Rattus norvegicus*)	5	0/0.025/0.05/0.1/0.3	% in water	N		ADL	U	DR	1	w	100	d	AD	M	C	FDB	WCON	WO		0.0250	Y	0.403	Y	0.03712		12.6	10	5	5	10	7	4	4	10	6	4	65
511	2830	Rader et al., 1981	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/15.1	mg/kg bw/d	N		ADL	U	DR	6	w	NR	NR	JV	M	C	ENZ	ALAD	UR		15.1	Y	0.337	N	0.0372		15.1	10	5	5	5	10	1	4	10	10	4	64
512	25888	Reinecke et al, 2000	Lead	100	Shrew (*Sorex araneus*)	2	0/211	ug/org/d	N		DLY	M	FD	12	d	NR	NR	JV	NR	C	GRS	BDWT	WO		211	Y	0.0137	N	0.00202		15.4	10	10	10	4	6	4	4	10	3	4	65
513	3721	Chowdhury et al., 1984	Lead acetate	54.61	Rat (*Rattus norvegicus*)	4	0/0.25/0.5/1.0	g/L	N		ADL	U	DR	60	d	NR	NR	SM	M	C	ENZ	ALAD	UR		0.250	Y	0.21357	N	0.02467		15.8	10	5	5	5	6	1	4	10	6	4	56
514	3721	Chowdhury et al., 1984	Lead acetate	54.61	Rat (*Rattus norvegicus*)	4	0/0.25/0.5/1.0	g/L	N		ADL	U	DR	60	d	NR	NR	SM	M	C	GRO	BDWT	WO		0.250	Y	0.21357	N	0.02467		15.8	10	5	5	5	6	8	4	10	6	4	63
515	2829	Rader et. al. 1981	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/16.1	mg/kg bw/d	N		NR	U	DR	7	w	NR	NR	JV	M	C	CHM	FEPR	BL		16.1	Y	0.341	N	0.03759		16.1	10	5	5	5	10	1	4	10	10	4	64
516	2829	Rader et. al. 1981	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/16.1	mg/kg bw/d	N		NR	U	DR	7	w	NR	NR	AD	M	C	CHM	FEPR	BL		16.1	Y	0.392	N	0.04262		16.1	10	5	5	5	10	1	4	10	3	4	57
517	2829	Rader et. al. 1981	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/16.1	mg/kg bw/d	N		NR	U	DR	5	w	NR	NR	AD	B	C	PHY	EXCR	UR		16.1	Y	0.392	N	0.04262		16.1	10	5	5	5	10	4	4	10	3	4	60
518	2918	Verlangieri et al., 1983	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/74.5	mg/L	N		ADL	U	DR	52	w	NR	NR	JV	B	C	ENZ	ALAD	UR		74.5	Y	0.606	N	0.06308		16.4	10	5	5	5	7	1	4	10	10	4	61
519	2918	Verlangieri et al., 1983	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/74.5	mg/L	N		ADL	U	DR	52	w	NR	NR	JV	B	C	BEH	ACTV	WO		74.5	Y	0.606	Y	0.13366		16.4	10	5	5	5	7	4	4	10	10	4	64
520	14803	Wells, et.al, 1986	Lead acetate	100	Cattle (*Bos taurus*)	2	0/20	mg/kg bw/d	N		DLY	U	DR	273	d	3	mo	JV	M	C	CHM	HEMT	BL		20.0	N	na	N	na		20.0	10	5	5	5	10	1	4	10	10	4	64
521	7350	Torra et al., 1989	Lead acetate	100	Mouse (*Mus musculus*)	2	0/0.97	mg/org	N		NR	U	DR	6	mo	9	w	JV	NR	C	ENZ	ALAD	BL		0.970	N	0.045	N	0.00607		21.6	10	5	5	5	5	1	4	10	10	4	59
522	2670	Hamilton and O'Flaherty, 1994	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/250/1000	mg/L	N		ADL	U	DR	92	d	25	d	LC	F	V	CHM	CALC	TB		250	Y	0.224	N	0.02575		28.7	10	5	5	5	6	1	4	10	10	7	63

Appendix 6.1 Mammalian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
Lead

Ref			Exposure																				Effects					Conversion to mg/kg bw/day				Result		Data Evaluation Score											
Result #	Ref N.		Chemical Form	MW%	Test Species	# of Conc/ Doses	Conc/ Doses	Conc/Dose Units	Wet Weight Reported?	Percent Moisture	Application Frequency	Method of Analyses	Route of Exposure	Exposure Duration	Duration Units	Age	Age Units	Lifestage	Sex	Control Type	Effect Type	Effect Measure	Response Site	Study NOAEL	Study LOAEL	Body Weight Reported?	Body Weight in kg	Ingestion Rate Reported?	Ingestion Rate in kg or L/day	NOAEL Dose (mg/kg/day)	LOAEL Dose (mg/kg/day)	Data Source	Dose Route	Test Concentrations	Chemical form	Dose Quantification	Endpoint	Dose Range	Statistical Power	Exposure Duration	Test Conditions	Total
523	2678	Hammond and Succop, 1995	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/250	mg/L	N		ADL	U	DR	5	d	26	d	JV	F	C	FDB	CAIN	WO		250	N	0.204	N	0.02368		29.0	10	5	5	5	5	4	4	10	10	4	62
524	2776	Minnema and Hammond, 1994	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/250	mg/L	N		NR	U	DR	10	d	26	d	JV	F	V	FDB	WCON	WO		250	Y	0.13	N	0.01578		30.4	10	5	5	5	6	4	4	10	10	4	63
525	2776	Minnema and Hammond, 1994	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/250	mg/L	N		NR	U	DR	10	d	26	d	JV	F	V	CHM	Other	BL		250	Y	0.13	N	0.01578		30.4	10	5	5	5	6	1	4	10	10	4	60
526	2732	Kempings et. al 1988	Lead acetate	54.61	Rat (*Rattus norvegicus*)	3	0/0.5/1.0	g/L	N		ADL	U	DR	90	d	NR	NR	LC	M	C	CHM	Other	BL		0.500	Y	0.12	N	0.01469		33.4	10	5	5	5	6	1	4	10	10	4	60
527	14852	Bankowska and Hine, 1985	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/350	mg/L	N		ADL	U	DR	10	w	NR	NR	JV	M	C	CHM	HMCT	BL		350	Y	0.352	N	0.03868		38.5	10	5	5	5	6	1	4	10	10	4	60
528	14852	Bankowska and Hine, 1985	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/350	mg/L	N		ADL	U	DR	10	w	NR	NR	JV	M	C	ORW	SMIX	BR		350	Y	0.352	N	0.03868		38.5	10	5	5	5	6	4	4	10	10	4	63
529	3864	Hayashi, 1983	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/500	mg/L	N		ADL	U	DR	18	d	NR	NR	GE	F	C	ENZ	ALAD	BL		500	N	0.32	N	0.0355		55.5	10	5	5	5	5	1	4	10	10	4	59
530	1717	Bataineh et al., 1998	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/1000	ppm in mg/L	N		ADL	U	DR	12	w	21-23	d	JV	M	V	BEH	AGGT	WO		1000	Y	0.34474	N	0.03796		60.1	10	5	5	5	6	4	4	10	3	4	56
531	1717	Bataineh et al., 1998	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/1000	mg/L	N		ADL	U	DR	12	w	NR	NR	AD	M	V	GRS	BDWT	WO		1000	Y	0.34474	N	0.03796		60.1	10	5	5	5	6	4	4	10	3	4	56
532	1717	Bataineh et al., 1998	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/1000	mg/L	N		ADL	U	DR	12	w	NR	NR	NR	M	V	REP	TEWT	TE		1000	Y	0.34474	N	0.03796		60.1	10	5	5	5	6	10	4	10	3	4	62
533	2545	Bourjeily and Suszkiw, 1997	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/0.2	% in water	N		ADL	U	DR	28	d	NR	NR	LC	F	C	ENZ	ACHE	BR		0.200	N	0.35	N	0.03849		120	10	5	5	5	5	1	4	10	10	4	59
534	2906	Talcott and Koller, 1983	Lead acetate	100	Mouse (*Mus musculus*)	2	0/1000	mg/L	N		NR	U	DR	18	w	6-8	w	LC	F	C	ORW	SMIX	LI		1000	Y	0.03755	N	0.00516		137	10	5	5	5	6	4	4	10	10	4	63
535	2750	Lessler and Wright, 1976	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/68	mg/org/d	N		ADL	U	FD	4	w	NR	NR	YO	M	C	GRO	BDWT	WO		68.0	Y	0.390	N	0.03168		174	10	10	5	5	6	8	4	10	3	4	65
536	14750	Blanusa, et al, 1989	Lead acetate	100	Rat (*Rattus norvegicus*)	5	0/1500/3500/5500/7500	mg/L	N		NR	U	DR	6	w	4	mo	GE	F	C	ORW	SMIX	KI		1500	Y	0.19	N	0.02221		175	10	5	5	5	6	4	4	10	10	4	63
537	14816	Cramer et al, 1980	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/60	mg/org/d	N		ADL	U	DR	6	d	NR	NR	GE	F	C	FDB	WCON	WO		60.0	N	0.338	N	0.0373		178	10	5	5	5	5	4	4	10	10	4	62
538	2924	Wadi and Ahmad, 1999	Lead acetate	54.61	Mouse (*Mus musculus*)	3	0/0.25/0.5	% in water	N		ADL	U	DR	6	w	7	w	SM	M	C	REP	SPCL	TE		0.250	Y	0.0398	N	0.00544		187	10	5	5	5	6	10	4	10	6	4	65
539	2888	Sokol et al., 1985	Lead acetate	54.61	Rat (*Rattus norvegicus*)	3	0/0.1/0.3	% water	N		ADL	U	DR	30	d	52	d	JV	M	C	HRM	GHRM	BL		0.100	Y	0.37188	Y	0.135		198	10	5	5	5	7	1	4	10	10	4	61
540	13216	Rabe et al., 1985	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/0.5	% in water	N		ADL	U	DR	21	d	80	d	JV	F	C	FDB	WCON	WO		0.500	Y	0.351	Y	0.02808		218	10	5	5	5	7	4	4	10	10	4	64
541	2922	Vyskocil et al., 1989	Lead acetate	54.61	Rat (*Rattus norvegicus*)	4	0/0.5/1/2	% in water	N		ADL	U	DR	2	mo	8	w	JV	M	C	ORW	SMIX	KI		0.500	Y	0.2	N	0.02326		318	10	5	5	5	6	4	4	10	10	4	63
542	2887	Sokol, 1989	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/6000	mg/L	N		ADL	U	DR	30	d	27	d	JV	M	C	HRM	TSTR	BL		6000	Y	0.412	N	0.04457		354	10	5	5	5	6	1	4	10	10	4	60
543	2846	Ronis et al., 1996	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/6000	mg/L	N		ADL	U	DR	14	d	24	d	JV	M	C	AVO	WATR	WO		6000	Y	0.333	N	0.0368		362	10	5	5	5	6	4	4	10	3	4	56
544	2846	Ronis et al., 1996	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/6000	mg/L	N		ADL	U	DR	14	d	60	d	SM	M	C	HRM	TSTR	SR		6000	Y	0.333	N	0.0368		362	10	5	5	5	6	1	4	10	3	4	53
545	2887	Sokol, 1989	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/6000	mg/L	N		ADL	U	DR	30	d	52	d	JV	M	C	HRM	TSTR	BL		6000	Y	0.32	N	0.0355		364	10	5	5	5	6	1	4	10	10	4	60
546	2846	Ronis et al., 1996	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/6000	mg/L	N		ADL	U	DR	50	d	60	d	MA	B	C	AVO	WATR	WO		6000	Y	0.26	N	0.02945		371	10	5	5	5	6	4	4	10	10	4	63
547	2846	Ronis et al., 1996	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/6000	mg/L	N		ADL	U	DR	50	d	24	d	JV	M	C	HRM	LUHO	SR		6000	Y	0.26	N	0.02945		371	10	5	5	5	6	1	4	10	10	4	60
548	2799	Ogilvie and Martin, 1981	Lead acetate	100	Mouse (*Mus musculus*)	2	0/2732	mg/L	N		NR	U	DR	2	w	NR	NR	AD	M	C	ORW	SMIX	SP		2732	Y	0.034	N	0.00472		379	10	5	5	5	6	4	4	10	10	4	63
549	14822	Gerber et al, 1978	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/0.5	% in diet	N		NR	U	FD	14	mo	0	d	JV	NR	C	CHM	GBCM	BR		0.500	Y	0.278	N	0.024		431	10	10	5	5	6	1	4	10	10	4	65
550	2938	Wiszniewska et al., 1998	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/1	% in water	N		ADL	U	DR	9	mo	90	d	SM	M	C	CHM	PHST	TE		1.00	Y	0.5	N	0.05305		579	10	5	5	5	6	1	4	10	10	4	60
551	2938	Wiszniewska et al., 1998	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/1	% in water	N		ADL	U	DR	9	mo	21	d	GE	M	C	HIS	GHIS	TE		1.00	Y	0.5	N	0.05305		579	10	5	5	5	6	4	4	10	10	4	63
552	2711	Jacquet, 1977	Lead acetate	100	Mouse (*Mus musculus*)	2	0/0.5	% in diet	N		DLY	U	FD	7	d	NR	NR	GE	F	C	HRM	PROH	PL		0.500	N	0.02875	N	0.00371		646	10	10	5	5	5	1	4	10	10	4	64
553	3749	Ogilvie, 1977	Lead acetate	54.61	Mouse (*Mus musculus*)	2	0/10	mg/ml	N		NR	U	DR	2	w	NR	NR	AD	M	C	BEH	ACTP	WO		10.0	Y	0.0328	N	0.00457		761	10	5	5	5	6	4	4	10	3	4	56
554	3749	Ogilvie, 1977	Lead acetate	54.61	Mouse (*Mus musculus*)	2	0/10	mg/ml	N		NR	U	DR	2	w	NR	NR	LC	M	C	GRO	BDWT	WO		10.0	Y	0.03205	N	0.00448		763	10	5	5	5	6	8	4	10	3	4	60
555	14822	Gerber et al, 1978	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/1.0	% in diet	N		NR	U	FD	14	mo	0	d	JV	NR	C	CHM	GBCM	BR		1.00	Y	0.278	N	0.0240		863	10	10	5	5	6	1	4	10	10	4	65
556	2523	Barlow et al., 1977	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/2	% in diet	N		ADL	U	FD	21	d	NR	NR	LC	F	C	ENZ	ALAD	LI		2.00	Y	0.21	N	0.01905		991	10	10	5	5	6	1	4	10	10	4	65
557	3914	Shafig-ur-Rehman et al., 1986	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/2	% in water	N		ADL	U	DR	10	d	NR	NR	AD	M	C	BEH	AMBU	WO		2.00	Y	0.18	N	0.02115		1280	10	5	5	5	6	4	4	10	3	4	56
558	2698	Holtzman et al., 1981	Lead carbonate	77.55	Rat (*Rattus norvegicus*)	2	0/4	% in diet	N		ADL	U	FD	2	w	60-80	d	JV	M	C	CHM	PCLV	BL		4.00	N	0.523	N	0.04032		2390	10	10	5	10	5	1	4	10	3	4	62
559	14827	Holtzman et al, 1980	Lead carbonate	77.55	Rat (*Rattus norvegicus*)	2	0/4	% in diet	N		ADL	U	FD	14	d	60	d	JV	M	C	CHM	PCLV	BL		4.00	Y	0.2929	N	0.02504		2650	10	10	5	10	6	1	4	10	3	4	63
560	2825	Powell et al, 1982	Lead carbonate	77.55	Rat (*Rattus norvegicus*)	2	0/6	% in diet	N		NR	U	FD	15	w	NR	NR	AD	NR	C	HIS	GHIS	NE		6.00	N	0.5	N	0.03886		3620	10	10	5	5	5	4	4	10	10	2	65
Data Not Used to Derive Wildlife Toxicity Reference Value - Measurements of biochemical, behavioral or pathology changes in progeny of exposed parents																																												
561	2705	Hubermont et al., 1976	Lead nitrate	100	Rat (*Rattus norvegicus*)	4	0/0.1/1.0/10	mg/L	N		NR	U	DR	9	w	10	w	GE	F	C	REP	Other	PY	1.00	10.0	N	0.338	N	0.0373	0.11	1.1	10	5	5	10	5	10	8	10	10	4	77
562	3826	Bull, 1983	Lead	100	Rat (*Rattus norvegicus*)	4	0/5/30/200	mg/L	N		ADL	U	DR	56	d	90-100	d	LC	F	C	REP	Other	PY	5.00	30.0	N	0.3846	N	0.04189	0.545	3.3	10	5	5	4	5	10	8	10	10	4	71
563	2631	Fox et al., 1997	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/109/1090	mg/kg diet	N		ADL	U	FD	21	d	55-60	d	LC	F	C	REP	Other	PY	109	1090	N	0.179	N	0.0167	10.2	102	10	10	5	5	5	10	8	10	10	7	80
564	14814	Clayton et al., 1981	Lead	100	Rat (*Rattus norvegicus*)	3	0/300/1000	mg/L	N		NR	U	DR	31	d	NR	NR	GE	F	C	REP	Other	PY		300	N	0.4	N	0.0434	32.5	108	10	5	5	4	5	10	4	10	10	4	67
565	2682	Hasan et al., 1989	Lead chloride	74.5	Rat (*Rattus norvegicus*)	2	0/400	mg/L	N		NR	U	DR	42	d	NR	NR	LC	F	C	REP	OHIS	PY	400		N	0.32	N	0.0355	33.1		10	5	5	10	5	10	4	3	10	4	66
566	14823	Goldman et al, 1980	Lead acetate	54.61	Rat (*Rattus norvegicus*)	4	0/0.05/0.1/0.2	% in water	N		DLY	U	DR	21	d	NR	NR	LC	F	V	REP	OTHR	PY	0.100	0.200	N	0.4	N	0.0434	59.3	119	10	5	5	5	5	10	10	10	10	4	74
567	13268	Reiter et al., 1975	Lead acetate	100	Rat (*Rattus norvegicus*)	3	0/5/50	mg/L	N		NR	U	DR	82	d	NR	NR	GE	F	C	REP	Other	PY		5.00	N	0.35	N	0.03849		0.550	10	5	5	5	5	10	4	10	10	4	68
568	2876	Sierra and Tiffany-Castiglioni, 1992	Lead acetate	100	Guinea pig (*Cavia porcellus*)	3	0/5.5/11.0	mg/kg bw/d	N		DLY	U	DR	30	d	NR	NR	GE	F	C	REP	Other	PY		5.50	Y	1.0	N	0.099		5.50	10	5	5	5	10	10	4	10	10	4	73
569	2574	Cookman et al., 1987	Lead chloride	74.5	Rat (*Rattus norvegicus*)	3	0/200/400	mg/L	N		ADL	U	DR	20	d	NR	NR	LC	F	C	REP	ODVP	PY		200	N	0.32	N	0.0355		16.5	10	5	5	10	5	10	4	10	10	4	73
570	2879	Singh et al., 1991	Lead acetate	100	Rat (*Rattus norvegicus*)	5	0/250/500/1000/2000	mg/L	N		DLY	U	DR	6	d	90	d	GE	F	C	REP	Other	PY		250	Y	0.2287	Y	0.0194		21.2	10	5	5	5	7	10	4	10	10	4	70
571	2575	Corpas et al , 1995	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/39.26	mg/kg bw/d	N		ADL	U	DR	3	w	NR	NR	GE	F	C	REP	ODVP	PY		39.3	N	0.32	Y	0.04248		21.4	10	5	5	5	10	10	4	10	10	4	73
572	2765	McCauley et al., 1982	Lead chloride	100	Rat (*Rattus norvegicus*)	2	0/200	mg/L	N		NR	U	DR	7	w	70	d	GE	F	C	REP	Other	PY		200	N	0.204	N	0.02368		23.2	10	5	5	10	5	10	4	10	10	4	73
573	12587	McCauley et al , 1979	Lead chloride	100	Rat (*Rattus norvegicus*)	2	0/200	mg/L	N		DLY	U	DR	50	d	70	d	GE	F	C	REP	OHIS	PY		200	N	0.2024	N	0.02351		23.2	10	5	5	10	5	10	4	10	10	4	73
574	2780	Murphy et al., 1995	Lead chloride	74.5	Rat (*Rattus norvegicus*)	2	0/400	mg/L	N		ADL	U	DR	30	d	NR	NR	LC	F	C	REP	OHIS	PY		400	N	0.32	N	0.0355		33.1	10	5	5	10	5	10	4	10	10	4	73

Appendix 6.1 Mammalian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
Lead

Ref			Exposure																			Effects					Conversion to mg/kg bw/day				Result		Data Evaluation Score													
Result #	Ref N.		Chemical Form	MW%	Test Species	# of Conc/ Doses	Conc/ Doses	Conc/Dose Units	Wet Weight Reported?	Percent Moisture	Application Frequency	Method of Analyses	Route of Exposure	Exposure Duration	Duration Units	Age	Age Units	Lifestage	Sex		Control Type	Effect Type	Effect Measure	Response Site	Study NOAEL	Study LOAEL	Body Weight Reported?	Body Weight in kg	Ingestion Rate Reported?	Ingestion Rate in kg or L/day	NOAEL Dose (mg/kg/day)	LOAEL Dose (mg/kg/day)	Data Source	Dose Route	Test Concentrations	Chemical form	Dose Quantification	Endpoint	Dose Range	Statistical Power	Exposure Duration	Test Conditions	Total
575	2910	Tian et al., 1995	Lead acetate	54.61	Rat (*Rattus norvegicus*)	2	0/0.2	% in water	N		DLY	U	DR	14	d	30	d	JV	F		C	REP	Other	PY		0.200	N	0.35	N	0.03849		120	10	5	5	5	5	10	4	10	10	4	68
576	2729	Kawamoto,1984	Lead acetate	100	Rat (*Rattus norvegicus*)	2	0/1090	ug/g	N		ADL	U	DR	20	d	NR	NR	JV	F		C	REP	Other	PY		1090	N	0.302	N	0.0337		122	10	5	5	5	5	10	4	10	10	4	68
577	14749	Maljkovic et al, 1988	Lead acetate	100	Rat (*Rattus norvegicus*)	5	0/1500/3500/5500/7500	mg/L	N		ADL	U	DR	35	d	NR	NR	LC	F		C	REP	Other	PY		1500	N	0.32	N	0.0355		166	10	5	5	5	5	10	4	10	10	4	68
578	14813	Carroll et al, 1977	Lead acetate	100	Mouse (*Mus musculus*)	4	0/2/5/10	mg/ml	N		DLY	U	DR	30	d	NR	NR	LC	F		C	REP	Other	PY		2.00	Y	0.035	N	0.0048		277	10	5	5	5	6	10	4	10	10	4	69
579	2615	Epstein et al., 1999	Lead acetate	54.61	Mouse (*Mus musculus*)	2	0/10	mg/ml	N		NR	U	DR	5	d	NR	NR	GE	F		C	REP	Other	PY		10.0	N	0.0325	N	0.00453		762	10	5	5	5	5	10	4	10	10	4	68
580	2615	Epstein et al., 1999	Lead acetate	54.61	Mouse (*Mus musculus*)	2	0/10	mg/ml	N		NR	U	DR	24	d	NR	NR	GE	F		C	REP	Other	PY		10.0	N	0.0325	N	0.00453		762	10	5	5	5	5	10	4	10	10	4	68
581	2510	Alfano et al., 1982	Lead carbonate	77.55	Rat (*Rattus norvegicus*)	2	0/4.0	% in diet	N		NR	U	FD	26	d	NR	NR	LC	F		C	REP	Other	PY		4.00	N	0.35	N	0.02899		2570	10	10	5	10	5	10	4	10	10	4	78
582	2512	Alfano et al., 1983	Lead carbonate	77.55	Rat (Rattus norvegicus)	2	0/4	% in diet	N		NR	U	FD	115	d	NR	NR	LC	F		C	REP	Other	PY		4.00	N	0.35	N	0.02899		2570	10	10	5	10	5	10	4	10	10	4	78
583	2814	Petit and Le Boutillier 1979	Lead carbonate	77.55	Rat (*Rattus norvegicus*)	2	0/4	% in diet	N		ADL	U	FD	24	d	NR	NR	LC	F		C	REP	Other	PY		4.00	N	0.35	N	0.02899		2570	10	10	5	10	5	10	4	10	10	4	78
584	2740	Krigman et al. 1975	Lead carbonate	77.55	Rat (*Rattus norvegicus*)	2	0/4	% in diet	Y		ADL	U	FD	25	d	NR	NR	LC	F		C	REP	Other	PY		4.00	N	0.35	N	0.02899		2700	10	10	5	10	5	10	4	10	10	4	78
585	2811	Pentschew and Garro 1966	Lead carbonate	77.55	Rat (*Rattus norvegicus*)	2	0/4.0	% in diet	NR		NR	M	FD	27	d	NR	NR	LC	F		C	REP	Other	PY		4.5	N	0.248	N	0.02184		2840	10	10	10	5	5	10	4	10	10	4	78

The abbreviations and definitions used in coding data are provided in Attachment 4-3 of the Eco-SSL Guidance (U.S.EPA, 2003).