Ecological Soil Screening Levels for DDT and Metabolites

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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 group effort of a multi-stakeholder group 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 DDT (and metabolites) and the documentation for their derivation. This document provides guidance and is designed to communicate national policy on identifying DDT (and metabolites) 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 DDT (AND METABOLITES)

DDT (1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane) was once produced and used as a broad spectrum pesticide. The potent insecticidal properties of DDT act by opening sodium channels in insect neurons, causing the neuron to fire spontaneously. This leads to uncontrolled spasming and eventual death. DDT was responsible for eradicating malaria from Europe and North America, and was also extensively used as an agricultural insecticide after 1945. Technical-grade DDT is a mixture of three forms, p,p'-DDT (85%), o,p'-DDT (15%), and

o,o'-DDT (trace amounts) and may also contain DDE (1,1-dichloro-2,2- bis(p-chlorophenyl) ethylene) and DDD (1,1-dichloro-2,2-bis(p-chlorophenyl)ethane) as contaminants. DDE and DDD are breakdown products of DDT and have similar chemical and physical properties (ATSDR, 2002). DDD was also used in the past to kill pests, but to a far lesser extent than DDT. DDE is only found in the environment as a result of the degradation of DDT. In 1975, DDT was banned for agricultural use in the U.S. but remains in use in some countries to control malaria. U.S. law also allows EPA to authorize unregistered use for a limited time under emergency conditions (USEPA, 2000; HSDB).

In soils, DDT is immobile under aerobic conditions with a mean half life ranging from 2 to 15 years (Racke et al., 1997; Lichtenstein and Schulz, 1959; Tu and Miles, 1976; Jury et al., 1983; Stewart and Chisholm, 1971; HSDB). DDT is metabolized by microbial systems in soils and is broken down into DDE and DDD. Significant degradation has been demonstrated in soils under anaerobic conditions, while little or no degradation was observed under aerobic conditions (Johnsen, 1976; Sanborn et al., 1977; Pan et al., 1970; HSDB). Biodegradation, however, is highly variable and influenced by the populations of required microorganisms (Johnsen, 1976; Sanborn et al., 1977; HSDB). Various amendments to soils such as energy and carbon sources, were shown to increase degradation under anaerobic but not aerobic conditions (Johnsen, 1976; Pan et al., 1970; Castro and Yoshida, 1974; HSDB). DDT has been shown to readily degrade in certain flooded soils (Castro and Yoshida, 1971; HSDB). DDT is apparently co-metabolized by microorganisms and is not used as a sole carbon source. Products of biodegradation include DDD and DDE and occasionally DBP (4,4'-dichlorobenzophenone) (Johnsen, 1976; Sanborn et al., 1977; HSDB).

DDT metabolism is through DDD, which can be subsequently degraded to dichlorobenozphenone (DDCO) or bis(p-chlorophenyl) methane. DDD degrades in the environment more rapidly than DDT itself or DDE. DDE is very stable to further degradation and there is no evidence to indicate that DDE is reduced to DDD (Callahan et al., 1979; HSDB). Biotransformation of DDT occurs more readily under anaerobic conditions than in aerobic systems; transformation of DDT to DDE is favored in aerobic systems, whereas DDD is the major metabolite in anaerobic environments. In some aerobic experiments both DDE and DDD have been found as metabolites (Callahan et al., 1979; HSDB). The products formed as a result of DDT metabolism are determined by the environment where metabolism or chemical transformation occurs. Some studies suggest that the ultimate transformation of DDT to DDCO by way of DDD requires cycling through anaerobic and aerobic systems, so that metabolism and transport by way of sorption/desorption will be required for total DDT degradation (Callahan et al., 1979; HSDB).

The 1972, the EPA decision to ban DDT for most uses in the U.S. was significantly influenced by a large body of scientific information documenting adverse effects to wildlife (U.S. EPA, 1975). These observed effects were severe, including the lethality of DDT to birds and fish and the DDE-induced reproductive effects in birds, particularly eggshell thinning (U.S. EPA, 1975). Historically, observations of high mortality in local wild bird populations occurred coincidentally with application of DDT for pest control (U.S. EPA, 1975). In particular, DDT has been cited as a major reason for the decline of the bald eagle in the 1950s and 1960s. The most important reproductive effect observed in birds concerns eggshell thinning.

Experimental studies established a scientific link between DDT/DDE/DDD exposure, particularly DDE, and avian eggshell thinning, which weighed significantly in the decision to ban most domestic crop uses of DDT in the 1970s (U.S. EPA, 1975). In general, raptors, waterfowl, passerines, and nonpasserine ground birds were more susceptible to eggshell thinning than domestic fowl and other gallinaceous birds, and DDE appears to have been a more potent inducer of eggshell thinning than DDT (Cooke, 1973; U.S. EPA, 1975; Lundholm, 1997; WHO, 1989). Further, reproductive disturbances associated with DDT/DDE/DDD exposure continue to be reported in North American populations of predatory birds and/or birds that migrate to regions such as South America where DDT is still used (Lundholm, 1997).

Possible mechanisms of eggshell thinning in birds have been extensively studied and reviewed (Cooke, 1973; U.S. EPA, 1975; Lundholm, 1997; Peakall et al., 1975; WHO, 1989). The leading hypothesis for DDE-induced thinning involves an inhibition by p,p'-DDE (but not by o,p'-DDE or DDT or DDD isomers) of prostaglandin synthesis in the shell gland mucosa (Lundholm, 1997). Overall, there is still some question as to the primary mechanism and reviewers have suggested that these may differ between bird species or differ with environmental conditions or physiological state for a given species.

Exposure to DDT/DDD/DDE is associated with reproductive toxicity in avian wildlife including embryo lethality (Porter and Wiemeyer 1969; Heath et al., 1969; Longcore et al. 1971), decreased egg size and weight (Wilson et al., 1973; Jefferies, 1969; Peakall 1970), delayed oviposition after mating (Vangilder and Peterle 1980; Cecil et al. 1971; Jefferies 1967, 1969; Richie and Peterle 1979; Peakall 1970), ovarian effects (Gish and Chura, 1970; Bitman et al.,1968; Keith and Mitchell, 1993) and testicular effects (Gish and Chura, 1970; Burlington and Lindeman, 1950; George and Sunararaj, 1995; Locke et al., 1966).

Table 2.1 DDT (and metabolites) Eco-SSLs (mg/kg dry weight in soil)

Plants	Soil Invertebrates	Wildlife	
		Avian	Mammalian
NA	NA	0.093	0.021

NA = Not Available. Data were insufficient to derive an Eco-SSL.

Eco-SSL values were derived for DDT (and metabolites) for avian and mammalian wildlife. Eco-SSL values for DDT (and metabolites) could not be derived for plants or soil invertebrates. For these receptor groups, data were insufficient to derive soil screening values. Eco-SSL values calculated for avian and mammalian wildlife are equal to 0.093 mg/kg dry weight (dw) and 0.021 mg/kg dw, respectively.

3.0 ECO-SSL FOR TERRESTRIAL PLANTS

Of the papers identified from the literature search process, 195 were selected for acquisition for further review. Of those papers acquired, five 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). Five received an Evaluation Score greater than ten. These studies are listed in Table 3.1.

There was only one study that was eligible to derive an Eco-SSL according to the Eco-SSL guidance (U.S. EPA, 2003; Attachment 3-2). A minimum of 3 results are required for calculation of an Eco-SSL. The remaining studies that scored 10 or higher were unbounded No Observed Adverse Effect Concentrations (NOAEC) that were not considered acceptable for use according to the Eco-SSL guidance (U.S. EPA, 2003; Attachment 3-2). An Eco-SSL could not be derived for plants for DDT (and metabolites).

4.0 ECO-SSL FOR SOIL INVERTEBRATES

Of the papers identified from the literature search process, 174 papers were acquired for further review. Of those papers acquired, eight 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). Eleven received an Evaluation Score greater than ten. These studies are listed in Table 4.1.

There were no studies that were eligible to derive an Eco-SSL according to the Eco-SSL guidance (U.S. EPA, 2003; Attachment 3-2). The available studies with a score higher than 10 are LC50 values (concentrations lethal to 50% of the test population) which are not considered acceptable for derivation of an Eco-SSL (U.S. EPA, 2003; Attachment 3-2). An Eco-SSL could not be derived for soil invertebrates for DDT (and metabolites).

Table 3.1 Plant Toxicity Data - DDT

Reference	IP Number	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?
Pareek and Gaur, 1970	17330	a	Common bean	*Phaseolus aureus*	7.8	0.9	0	GRO	MATC	7.1	12	Y	N
Rajanna and De la Cruz, 1977	16370*	a	Cotton	*Gossypium hirsutum*	6.6	0.85	1	GRO	NOAEC	50.0	15	N	N
Rajanna and De la Cruz, 1977	16370	b	Soybean	*Glycine max.*	6.6	0.85	1	GRO	NOAEC	50.0	15	N	N
Rajanna and De la Cruz, 1977	16370	c	Corn	*Zea mays*	6.6	0.85	1	GRO	NOAEC	50.0	15	N	N
Rajanna and De la Cruz, 1977	16370	d	Wheat	*Triticum aestivum*	6.6	0.85	1	GRO	NOAEC	50.0	15	N	N

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
NOAEC = No observed adverse effect concentration
OM = Organic matter content
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)

*In this paper results are presented for high, medium and low vigor seeds. High vigor seeds were untreated while medium vigor seeds were raised in moisture content to 16% stored for 15 days and then heated to 40 degrees C for two days and the low vigor seeds were heated for five days instead of two. Only the untreated high vigor seed results were considered acceptable for use in deriving Ec SSLs.

Table 4.1 Invertebrate Toxicity Data - DDT

Reference	IP Number	Study ID	Test Organism		Soil pH	OM%	Bio-availability Score	ERE	Tox Parameter	Tox Value (Soil Conc at mg/kg dw)	Total Evaluation Score	Eligible for Eco-SSL Derivation?	Used for Eco-SSL?
Harris, 1966	9602	a	Common cricket	*Gryllus pennsylvanicus*	≤ 7	0.0	1	MOR	LC_{50}	0.08	13	N	N
Harris, 1966	9602	b	Common cricket	*Gryllus pennsylvanicus*	≤ 7	0.5	1	MOR	LC_{50}	1.75	13	N	N
Harris, 1966	9602	c	Common cricket	*Gryllus pennsylvanicus*	≤ 7	1.4	1	MOR	LC_{50}	3.1	13	N	N
Harris, 1966	9602	d	Common cricket	*Gryllus pennsylvanicus*	≤ 7	2.0	1	MOR	LC_{50}	4.1	13	N	N
Harris, 1964	7783	a	Common cricket	*Gryllus pennsylvanicus*	7.2	1.4	1	MOR	LC_{50}	4.3	12	N	N
Harris, 1966	9602	e	Common cricket	*Gryllus pennsylvanicus*	≤ 7	6.6	0	MOR	LC_{50}	11.4	12	N	N
Harris, 1966	9602	f	Common cricket	*Gryllus pennsylvanicus*	≤ 7	9.1	0	MOR	LC_{50}	4.2	12	N	N
Harris, 1966	9602	g	Common cricket	*Gryllus pennsylvanicus*	≤ 7	15.9	0	MOR	LC_{50}	11.8	12	N	N
Harris, 1966	9602	h	Common cricket	*Gryllus pennsylvanicus*	≤ 7	18.8	0	MOR	LC_{50}	20.4	12	N	N
Harris, 1966	9602	i	Common cricket	*Gryllus pennsylvanicus*	≤ 7	39.8	0	MOR	LC_{50}	45.3	12	N	N
Harris, 1966	9602	j	Common cricket	*Gryllus pennsylvanicus*	≤ 7	64.6	0	MOR	LC_{50}	77.2	12	N	N

ERE = Ecologically relevant endpoint
LC_{50} = Concentration lethal to 50% of test population
MOR = Mortality
N = No
OM = Organic matter content
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)

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 value (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 1,149 papers with possible toxicity data for either avian or mammalian species. Of these papers, 977 papers were rejected for use as described in Section 7.5. Of the remaining papers, 105 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.

Within the 105 papers there are 278 results for biochemical (BIO), behavior (BEH), physiology (PHY), pathology (PTH), reproduction (REP), growth (GRO), and survival (MOR) endpoints that meet the Data Evaluation Score of > 65 for use to derive the TRV. 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 growth and reproduction is calculated at 4.66 mg DDT (and metabolites) /kg bw/day. However, this value is higher than the lowest bounded LOAEL for either reproduction, growth, or survival results. Therefore, the TRV is equal to the highest bounded NOAEL lower than the lowest bounded LOAEL for reproduction, growth, and survival results and is equal to 0.227 mg DDT (and metabolites) /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 for each of three surrogate species representing different trophic groups. The avian Eco-SSLs were calculated according to the Eco-SSL guidance (U.S. EPA, 2003) and are summarized in Table 5.2.

Table 5.1 Avian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
DDT and Metabolites
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Result #	Reference	Ref No.	Form	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 (BIO)																			
1	Heinz et al., 1980	990	DDE	Ringed turtle dove (*Streptopelia risoria*)	4	M	FD	8	w	NR	NR	AD	B	HRM	DOPA	BR	0.148	1.420	78
2	Greichus and Hannon 1973	3332	DDT	Double Crested Cormorants (*Phalacrocorax auritus*)	4	U	FD	9	w	NR	NR	JV	B	CHM	VTMA	LI	0.221	0.552	76
3	Dieter, 1975	3254	DDE	Starling (*Sturnus vulgaris*)	4	U	FD	7	w	NR	NR	NR	M	ENZ	CEST	PI	0.687	3.44	71
4	Bunyan et al., 1972	3209	DDE	Japanese quail (*Coturnix japonica*)	4	U	FD	21	d	4	w	JV	F	CHM	MCPR	LI	6.10	12.2	76
5	Chang and Stokstad, 1975	71	DDE	Japanese quail (*Coturnix japonica*)	3	U	FD	14	w	2	w	JV	F	ENZ	CAAH	EG	6.29	25.1	74
6	Chang and Stokstad, 1975	71	DDT	Japanese quail (*Coturnix japonica*)	3	U	FD	14	w	2	w	JV	F	ENZ	CAAH	EG	11.5		70
7	Bunyan et al., 1972	3209	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	21	d	4	w	JV	F	CHM	MCPR	LI	12.3		66
8	Cecil et al., 1971	3218	DDE	Japanese quail (*Coturnix japonica*)	2	U	FD	74	d	39	d	SM	F	CHM	CALC	EG	13.0		69
9	Chang and Stokstad, 1975	71	DDT	Japanese quail (*Coturnix japonica*)	3	U	FD	14	w	2	w	JV	F	ENZ	CAAH	EG	21.1		70
10	Chang and Stokstad, 1975	71	DDE	Japanese quail (*Coturnix japonica*)	5	U	FD	14	w	2	w	JV	F	ENZ	CAAH	EG	23.4		68
11	Biessmann and von Faber, 1981	3183	DDT	Japanese quail (*Coturnix japonica*)	3	U	FD	9	w	5	w	JV	F	CHM	LIPD	AR	32.5		69
12	Biessmann and von Faber, 1981	3183	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	5	w	5	w	JV	M	CHM	LIPD	AR	33.7		69
13	Cooke, 1970	14916	DDT	Japanese quail (*Coturnix coturnix)*	2	U	GV	3	w	73	d	JV	M	CHM	CALC	SR	37.6		70
14	Biessmann and von Faber, 1981	3183	DDE	Japanese quail (*Coturnix japonica*)	2	U	FD	5	w	5	w	JV	F	CHM	LIPD	AR	39.0		69
15	Dieter 1974	77	DDE	Quail (*Coturnix japonica*)	4	U	FD	12	w	2	mo	SM	M	ENZ	CRKI	NR		0.674	69
16	Peakall, 1970	14926	DDT	Ringed turtle dove (*Streptopelia risoria*)	2	U	FD	29	d	NR	NR	SM	B	ENZ	GENZ	LI		1.14	69
17	Wiemeyer et al, 1986	3662	DDE	American kestrel (*Falco sparverius*)	2	U	FD	1	yr	NR	NR	AD	M	CHM	LIPD	LI		1.30	70
18	Lundholm, 1985	3462	DDE	Duck (*Anas platyrhynchos*)	2	U	FD	45	d	1	yr	AD	F	CHM	CALC	RT		2.25	69
19	Lundholm, 1985	3462	DDE	Duck (*Anas platyrhynchos*)	2	U	FD	45	d	1	yr	AD	F	CHM	CALC	EG		2.25	69
20	Sell et al, 1971	1106	DDT	Chicken (*Gallus domesticus*)	3	U	FD	12	w	30	w	JV	F	ENZ	AHDX	LI		5.63	70
21	Bunyan and Page, 1973	3208	DDMU	Japanese quail (*Coturnix japonica*)	4	U	FD	21	d	4	w	JV	F	ENZ	AHDX	LI		6.15	69
22	Westlake et al., 1979	3656	DDMU	Japanese quail (*Coturnix japonica*)	4	U	FD	32	d	28	d	JV	F	ENZ	GOTR	PL		6.50	70
23	Stanley et al., 1978	3601	DDMU	Japanese quail (*Coturnix japonica*)	2	U	FD	31	d	4	w	JV	F	ENZ	G6PD	LI		12.0	69
24	Stanley et al., 1978	3601	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	31	d	4	w	JV	F	ENZ	G6PD	LI		12.0	69
25	Stanley et al., 1978	3601	DDE	Japanese quail (*Coturnix japonica*)	2	U	FD	31	d	4	w	JV	F	ENZ	G6PD	LI		12.0	69
26	Stanley et al., 1978	3601	DDD	Japanese quail (*Coturnix japonica*)	2	U	FD	31	d	4	w	NR	F	ENZ	G6PD	LI		12.0	69
27	Cecil et al., 1973	3187	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	2	mo	39	d	JV	F	CHM	VTMA	LI		12.3	70
28	Cecil et al., 1971	3218	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	74	d	39	d	SM	F	CHM	CALC	EG		13.0	69
29	Sifri et al., 1975	3591	DDT	Mallard duck (*Anas platyrhynchos*)	2	U	FD	14	d	8	d	JV	B	CHM	MCPR	LI		13.4	69
30	Gillett and Arscott, 1969	975	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	23	w	4	w	JV	M	ENZ	AEPX	LI		13.5	69
31	Sifri et al., 1975	3591	DDT	Chicken (*Gallus domesticus*)	2	U	FD	14	d	8	d	JV	B	CHM	MCPR	LI		13.8	69
32	Britton, 1975	3203	DDT	Chicken (*Gallus domesticus*)	2	U	FD	18	d	8	mo	JV	F	HRM	ESDL	LI		14.8	69
33	Bunyan and Page, 1973	3208	DDE	Japanese quail (*Coturnix japonica*)	2	U	FD	21	d	4	w	JV	F	ENZ	P450	LI		18.0	70
34	Sell et al., 1972	3583	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	4	w	0	d	JV	F	ENZ	AHDX	LI		26.0	69
35	Sell et al., 1972	3583	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	22	d	0	d	JV	B	ENZ	AHDX	LI		28.5	70
36	Britton, 1975	3203	DDT	Chicken (*Gallus domesticus*)	4	U	FD	18	d	8	mo	JV	F	HRM	ESDL	LI		31.6	69
37	Silver and Alpern, 1979	3592	DDT	Chicken (*Gallus domesticus*)	2	U	FD	3	w	8	d	JV	NR	CHM	CALC	PL		42.5	70
38	Ragland et al., 1971	3563	DDT	Duck (*Anas platyrhynchos*)	2	U	FD	8	d	NR	NR	JV	M	ENZ	GENZ	LI		71.0	69
39	Greichus and Hannon 1973	11434	DDT	White pelican (*Pelecanus erythrorhynchos*)	3	U	FD	10	w	NR	NR	JV	B	CHM	PRTL	BL		72.0	74
Behavior (BEH)																			
40	Heinz et al., 1980	990	DDE	Ringed turtle dove (*Streptopelia risoria*)	4	M	FD	8	w	NR	NR	AD	B	FDB	FCNS	WO	0.148	1.42	78
41	Davison and Sell, 1974	942	DDT	Duck (*Anas platyrhynchos*)	4	U	FD	343	d	2	yr	AD	F	FDB	FCNS	WO	0.754	7.54	70
42	Mahoney 1975	14896	DDE	White Throated Sparrow (*Zonotrichia albicollis*)	3	U	FD	4	d	NR	NR	NR	NR	BEH	NMVM	WO	1.0	5.2	72
43	Chang and Stokstad, 1975	71	DDE	Japanese quail (*Coturnix japonica*)	3	U	FD	14	w	2	w	JV	F	BEH	EQUL	WO	6.29	25.1	77
44	Azevedo et al., 1965	3801	DDT	Pheasant (*Phasianus colchicus*)	4	UX	FD	105	d	NR	NR	AD	B	FDB	FCNS	WO		0.411	73
45	Mahoney 1975	14896	DDT	White Throated Sparrow (*Zonotrichia albicollis*)	3	U	FD	6	w	NR	NR	NR	NR	BEH	NMVM	WO		1.04	68
46	Sifri et al., 1975	3591	DDT	Mallard duck (*Anas platyrhynchos*)	2	U	FD	14	d	8	d	JV	B	BEH	INST	WO		13.4	72
47	Sifri et al., 1975	3591	DDT	Chicken (*Gallus domesticus*)	2	U	FD	14	d	8	d	JV	B	BEH	INST	WO		13.8	72
Physiology (PHY)																			
48	Jefferies and French 1971	14921	DDT	Homing Pigeon (*Columba livia*)	3	U	OR	19	w	NR	NR	AD	B	PHY	BTMP	WO	0.237	2.85	69
49	Jefferies et al, 1971	14922	DDT	Bengalese finch (*Lonchura striata*)	2	U	FD	6	w	NR	NR	NR	B	PHY	HTRT	WO	3.80	7.50	84
50	Jefferies et al, 1971	14922	DDT	Homing Pigeon (*Columba livia*)	6	U	OR	3	w	NR	NR	AD	B	PHY	HTRT	WO		3.0	76
Pathology (PTH)																			
51	Heinz et al., 1980	990	DDE	Ringed turtle dove (*Streptopelia risoria*)	4	M	FD	8	w	NR	NR	AD	B	ORW	ORWT	LI	0.148	1.420	78
52	Greichus and Hannon 1973	3332	DDT	Double Crested Cormorants (*Phalacrocorax auritus*)	4	U	FD	9	w	NR	NR	JV	B	ORW	SMIX	LI	0.552	1.10	79
53	Chura and Stewart 1967	3766	DDT	Bald eagle (*Haliaeetus leucocephalus*)	2	U	FD	120	d	NR	NR	JV	B	ITX	GITX	WO	0.576		74
54	Dieter 1974	77	DDE	Quail (*Coturnix japonica*)	4	U	FD	12	w	2	mo	SM	M	ORW	SMIX	LI	0.674	3.37	76
55	Chura and Stewart 1967	3766	DDT	Bald eagle (*Haliaeetus leucocephalus*)	5	U	FD	55	d	NR	NR	AD	B	ITX	GITX	WO	0.713	11.41	76
56	Cecil et al., 1978	3220	DDT	Chicken (*Gallus domesticus*)	4	U	FD	30	d	11	mo	SM	M	ORW	ORWT	LI	2.29	22.9	73
57	Hurst et al., 1974	3388	DDT	Bobwhite quail (*Colinus virginianus*)	4	U	FD	2	mo	NR	NR	SM	B	ORW	ORWT	LI	5.16	51.6	77
58	Sell et al, 1971	1106	DDT	Chicken (*Gallus domesticus*)	3	U	FD	12	w	30	w	JV	F	ORW	ORWT	LI	11.3		73
59	Stanley et al., 1978	3601	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	31	d	4	w	JV	F	ORW	SMIX	LI	12.0		68
60	Stanley et al., 1978	3601	DDE	Japanese quail (*Coturnix japonica*)	2	U	FD	31	d	4	w	JV	F	ORW	SMIX	LI	12.0		70
61	Stanley et al., 1978	3601	DDD	Japanese quail (*Coturnix japonica*)	2	U	FD	31	d	4	w	JV	F	ORW	SMIX	LI	12.0		68
62	Bunyan et al., 1972	3209	DDE	Japanese quail (*Coturnix japonica*)	4	U	FD	21	d	4	w	JV	F	ORW	ORWT	LI	12.2		73
63	Bunyan et al., 1972	3209	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	21	d	4	w	JV	F	ORW	ORWT	LI	12.3		73
64	Cecil et al., 1973	3187	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	2	mo	39	d	JV	F	ORW	ORWT	LI	12.3		73
65	Gillett and Arscott, 1969	975	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	23	w	4	w	JV	M	ORW	ORWT	LI	13.5		70
66	Bunyan and Page, 1973	3208	DDE	Japanese quail (*Coturnix japonica*)	2	U	FD	21	d	4	w	JV	F	ORW	SMIX	LI	18.0		71
67	Hill et al., 1971	3377	DDT	Bobwhite quail (*Colinus virginianus*)	8	U	FD	5	d	NR	NR	AD	M	GRS	BDWT	WO	20.2	40.5	75
68	Britton, 1975	3204	DDT	Chicken (*Gallus domesticus*)	4	U	FD	9	w	19	mo	AD	F	ITX	GITX	WO	29.0	58.1	74

Table 5.1 Avian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
DDT and Metabolites
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Result #	Reference	Ref No.	Form	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
69	Cooke, 1970	14916	DDT	Japanese quail (*Coturnix coturnix)*	2	U	GV	3	w	73	d	JV	M	ORW	ORWT	LI	37.6		75
70	Jefferies and French 1971	14921	DDT	Homing Pigeon (*Columba livia*)	6	U	OR	56	d	NR	NR	AD	B	ORW	ORWT	TY		0.237	67
71	Ghosh et al., 1997	3315	DDD	Pigeon (*Coumba livia*)	2	U	OR	4	d	NR	NR	AD	B	HIS	GHIS	TY		0.40	69
72	Wiemeyer et al, 1986	3662	DDE	American kestrel (*Falco sparverius*)	2	U	FD	1	yr	NR	NR	AD	M	GRS	BDWT	WO		1.30	73
73	Lehman et al., 1974	3438	DDT	Bobwhite quail (*Colinus virginianus*)	4	U	FD	242	d	28	d	JV	F	ORW	ORWT	BR		1.79	72
74	Lillie et al., 1973	3440	DDT	Chicken (*Gallus domesticus*)	2	U	FD	28	w	72	w	SM	F	GRS	BDWT	WO		2.74	78
75	Kolaja and Hinton, 1978	3430	DDT	Mallard duck (*Anas platyrhynchos*)	2	U	FD	6	mo	NR	NR	LB	F	HIS	GHIS	SG		2.81	72
76	Jefferies et al, 1971	14922	DDT	Homing Pigeon (*Columba livia*)	7	U	OR	8	w	NR	NR	AD	B	ORW	ORWT	HE		3.0	76
77	Kolaja and Hinton, 1976	3378	DDT	Mallard duck (*Anas platyrhynchos*)	2	U	FD	7	w	NR	NR	NR	F	HIS	EDMA	RT		4.22	72
78	Genelly and Rudd, 1955	14919	DDT	Ring-necked pheasant (*Phasianus colchicus*)	3	U	FD	74	d	6	mo	JV	B	HIS	GHIS	LI		6.02	73
79	Bunyan and Page, 1973	3208	DDMU	Japanese quail (*Coturnix japonica*)	4	U	FD	21	d	4	w	JV	F	ORW	SMIX	LI		6.15	73
80	Jefferies and French, 1969	3400	DDT	Homing Pigeon (*Columba livia*)	4	U	OR	42	d	NR	NR	AD	B	ORW	ORWT	BR		9.10	80
81	Stanley et al., 1978	3601	DDMU	Japanese quail (*Coturnix japonica*)	2	U	FD	31	d	4	w	JV	F	ORW	SMIX	LI		12.0	72
82	Sifri et al., 1975	3591	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	14	d	8	d	JV	B	ORW	SMIX	LI		13.0	72
83	Biessmann and von Faber, 1981	3183	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	5	w	5	w	JV	M	HIS	CTYP	AR		33.7	72
84	Biessmann and von Faber, 1981	3183	DDE	Japanese quail (*Coturnix japonica*)	2	U	FD	5	w	5	w	JV	F	ORW	SMIX	AR		39.0	72
85	Silver and Alpern, 1979	3592	DDT	Chicken (*Gallus domesticus*)	2	U	FD	3	w	8	d	JV	NR	ORW	SMIX	LI		42.5	73
86	Greichus and Hannon 1973	11434	DDT	White pelican (*Pelecanus erythrorhynchos*)	2	U	FD	10	w	NR	NR	JV	B	ORW	SMIX	LI		72.0	77
87	Tarrant et al., 1983	3622	DDMU	Japanese quail (*Coturnix japonica*)	2	M	FD	7	d	28	d	JV	F	ORW	SMIX	LI		145	78
				Reproduction (REP)															
88	Lincer, 1975	3443	DDE	American kestrel (*Falco sparverius*)	5	U	FD	6	mo	NR	NR	LB	F	EGG	ESTH	EG	0.0396	0.396	83
89	Carlisle et al., 1986	3215	DDE	Mallard duck (*Anas platyrhynchos*)	4	U	FD	22	w	NR	NR	LB	F	REP	ESTH	EG	0.0563	0.281	82
90	Davison and Sell, 1974	942	DDT	Duck (*Anas platyrhynchos*)	4	U	FD	22	w	NR	NR	SM	F	EGG	ESWT	EG	0.0754	0.754	84
91	Davison and Sell, 1974	942	DDT	Duck (*Anas platyrhynchos*)	5	U	FD	3	mo	1	yr	LB	F	EGG	ESTH	EG	0.113	1.13	83
92	Davison and Sell, 1974	942	DDT	Duck (*Anas platyrhynchos*)	4	U	FD	343	d	2	yr	LB	F	EGG	ESTH	EG	0.197	1.97	84
93	Smith, et.al. 1969	3805	DDT	Chicken (*Gallus domesticus*)	5	U	FD	2	mo	NR	NR	LB	F	EGG	ESTH	EG	0.370	0.494	84
94	Heath et al, 1969	3722	DDT	Mallard duck (*Anas platyrhynchos*)	3	U	FD	1	yr	NR	NR	LB	F	REP	RSUC	WO	0.563	1.892	84
95	Vangilder and Peterle, 1981	3638	DDE	Mallard duck (*Anas platyrhynchos*)	2	U	FD	66	d	NR	NR	LB	F	EGG	EGWT	EG	0.563		78
96	Haseltine et al., 1974	3356	DDE	Pheasant (*Phasianus colchicus*)	2	U	FD	11	w	NR	NR	LB	F	EGG	ESTH	EG	0.592		78
97	Davison et al 1976	3239	DDT	Japanese quail (*Coturnix japonica*)	4	U	FD	16	w	9	w	LB	F	REP	TPRD	WO	1.30	5.20	82
98	Lillie et al., 1973	3440	DDT	Chicken (*Gallus domesticus*)	3	U	FD	40	w	26	w	LB	F	REP	FERT	WO	1.93		71
99	Stephen et al, 1971	14929	Mixture	Chicken (*Gallus domesticus*)	2	U	FD	18	d	18	mo	LB	F	EGG	ESQU	EG	1.94		69
100	Carnio and McQueen, 1973	3216	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	50	d	60	d	LB	B	REP	FERT	WO	1.95		69
101	Lundholm, 1990	3459	DDE	Chicken (*Gallus domesticus*)	2	U	FD	45	d	55	w	LB	F	EGG	ESWT	EG	1.98		78
102	Cecil et. al. 1972	3219	DDT	Chicken (*Gallus domesticus*)	4	U	FD	28	w	NR	NR	LB	F	EGG	EGWT	EG	2.47		69
103	Cecil et. al. 1972	3219	DDT	Chicken (*Gallus domesticus*)	4	U	FD	28	w	NR	NR	LB	F	EGG	EGWT	EG	2.47		69
104	Cecil et. al. 1972	3219	DDE	Chicken (*Gallus domesticus*)	4	U	FD	28	w	NR	NR	LB	F	EGG	EGWT	EG	2.47		69
105	Lillie et al., 1973	3440	DDT	Chicken (*Gallus domesticus*)	3	U	FD	40	w	26	w	LB	F	REP	FERT	WO	2.72		71
106	Lillie et al., 1973	3440	DDT	Chicken (*Gallus domesticus*)	3	U	FD	40	w	26	w	LB	F	REP	FERT	WO	2.74		71
107	Lillie et al., 1973	3440	DDT	Chicken (*Gallus domesticus*)	2	U	FD	28	w	72	w	LB	F	REP	TPRD	WO	2.74		71
108	Kolaja, 1977	3427	DDE	Mallard duck (*Anas platyrhynchos*)	3	U	FD	7	d	NR	NR	LB	F	EGG	ESTH	EG	2.83		69
109	Kolaja, 1977	3427	DDT	Mallard duck (*Anas platyrhynchos*)	3	U	FD	14	d	NR	NR	LB	F	EGG	ESTH	EG	2.83		69
110	Lillie et al., 1972	3442	DDT	Chicken (*Gallus domesticus*)	4	U	FD	28	w	26	w	LB	F	REP	FERT	WO	2.99		80
111	Lillie et al., 1972	3442	DDT	Chicken (*Gallus domesticus*)	4	U	FD	28	w	26	w	LB	F	REP	FERT	WO	3.01		80
112	Lillie et al., 1972	3442	DDE	Chicken (*Gallus domesticus*)	4	U	FD	28	w	26	w	LB	F	REP	FERT	WO	3.03		80
113	Arscott et al 1972	3166	DDT	Chicken (*Gallus domesticus*)	2	U	FD	32	w	NR	NR	SM	M	REP	GREP	SM	3.08		66
114	Azevedo et al., 1965	3801	DDT	Pheasant (*Phasianus colchicus*)	4	UX	FD	105	d	NR	NR	LB	Ff	REP	PROG	WO	4.51	6.07	85
115	Scott, 1977	3579	DDT	Chicken (*Gallus domesticus*)	3	U	FD	10	w	NR	mo	LB	F	REP	TPRD	WO	4.67		76
116	Scott et al., 1975	3580	DDT	Chicken (*Gallus domesticus*)	3	U	FD	10	w	NR	NR	LB	F	REP	PROG	WO	4.67		78
117	Davison et al 1976	3239	DDT	Japanese quail (*Coturnix japonica*)	4	U	FD	12	w	9	w	LB	F	EGG	EGWT	EG	5.20		69
118	Chang and Stokstad, 1975	71	DDT	Japanese quail (*Coturnix japonica*)	3	U	FD	14	w	2	w	LB	F	EGG	ESTH	EG	5.28	21.1	83
119	Simpson et al., 1972	3593	DDT	Turkey (*Meleagris gallopavo*)	2	U	FD	15	w	6	w	JV	M	REP	RHIS	TE	6.09		69
120	Simpson et al., 1972	3593	DDT	Turkey (*Meleagris gallopavo*)	2	U	FD	15	w	6	w	JV	M	REP	RHIS	TE	6.09		69
121	Grassle and Biessmann, 1982	3324	DDT	Japanese quail (*Coturnix japonica*)	3	U	FD	70	d	5	w	LB	B	EGG	CRAK	EG	6.50	32.5	82
122	Pepperell, 1972	3548	DDT	Chicken (*Gallus domesticus*)	4	U	FD	6	w	NR	NR	LB	F	EGG	FTEG	EG	9.37	46.9	83
123	Davison and Sell 1972	944	DDT	Chicken (*Gallus domesticus*)	3	U	FD	12	w	30	w	LB	F	REP	NOPN	EG	9.85		79
124	Chang and Stokstad, 1975	71	DDT	Japanese quail (*Coturnix japonica*)	3	U	FD	14	w	2	w	LB	F	EGG	ESTH	EG	11.5		79
125	Scott et al., 1975	3580	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	10	w	NR	NR	LB	F	REP	PROG	WO	12.3		74
126	Scott, 1977	3579	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	10	w	NR	NR	LB	F	REP	TPRD	WO	12.7		74
127	Waibel et al., 1972	3642	DDT	Chicken (*Gallus domesticus*)	2	U	FD	30	d	9	mo	LB	F	REP	TPRD	WO	14.1		70
128	Robson et al., 1976	3575	DDE	Japanese quail (*Coturnix japonica*)	3	U	FD	168	d	1	d	LB	F	EGG	CRAK	EG	14.2	42.5	86
129	Britton, 1975	3204	DDT	Chicken (*Gallus domesticus*)	4	U	FD	28	d	19	mo	LB	F	EGG	ESTH	EG	14.5	29.0	84
130	Robson et al., 1976	3575	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	168	d	1	d	LB	F	REP	TPRD	WO	16.4		71
131	Chang and Stokstad, 1975	71	DDE	Japanese quail (*Coturnix japonica*)	5	U	FD	14	w	2	w	LB	F	EGG	CRAK	EG	22.4		79
132	Cecil et al., 1978	3220	DDT	Chicken (*Gallus domesticus*)	4	U	FD	30	d	11	mo	SM	M	REP	TEWT	TE	22.9		66
133	George and Sundararaj 1995	3313	DDT	Chicken (*Gallus domesticus*)	6	U	OR	47	w	30	w	JV	M	REP	SPCV	SM	25.0	37.5	92
134	Davison et al 1976	3239	DDE	Japanese quail (*Coturnix japonica*)	5	U	FD	13	w	14	w	LB	F	EGG	EGWT	EG	25.0		71
135	Smith et al., 1969	3595	DDT	Japanese quail (*Coturnix japonica*)	4	U	FD	40	d	8	w	LB	F	EGG	FTEG	EG	25.7	51.5	84
136	Cooke, 1970	14916	DDT	Japanese quail (*Coturnix coturnix)*	2	U	GV	3	w	73	d	JV	M	REP	TEWT	TE	37.6		79
137	Mendenhall et al., 1983	1042	DDE	Barn owl (*Tyto alba*)	2	M	FD	1	yr	1.5- 6	yr	LB	F	REP	PROG	WO		0.211	83
138	Vanglider and Peterle, 1983	3636	DDE	Mallard duck (*Anas platyrhynchos*)	2	U	FD	61	d	NR	NR	LB	F	EGG	EGWT	WO		0.281	78
139	Dasadhikari, et al, 1996	3157	DDD	pigeon (*Coumba livia*)	2	U	OR	5	d	NR	NR	AD	M	REP	TEDG	TE		0.294	74

Table 5.1 Avian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
DDT and Metabolites
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Result #	Reference	Ref No.	Form	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
140	Peakall et al., 1973	3545	DDE	American kestrel (*Falco sparverius*)	4	U	FD	14	d	NR	NR	LB	F	EGG	ESTH	EG		0.366	78
141	Heath et al, 1969	3722	DDD	Mallard duck (*Anas platyrhynchos*)	3	U	FD	1	yr	NR	NR	LB	F	REP	RSUC	WO		0.473	78
142	Cecil et al., 1973	3217	DDT	Chicken (*Gallus domesticus*)	3	U	FD	2	mo	2	yr	LB	F	EGG	ESTH	EG		0.494	78
143	Cecil et al., 1973	3217	DDT	Chicken (*Gallus domesticus*)	3	U	FD	2	mo	2	yr	LB	F	EGG	ESTH	EG		0.494	78
144	Haseltine et al., 1974	3356	DDE	Mallard duck (*Anas platyrhynchos*)	2	U	FD	5	mo	NR	NR	LB	F	EGG	ESTH	EG		0.562	78
145	Kolaja, 1977	3427	DDT	Mallard duck (*Anas platyrhynchos*)	3	U	FD	14	d	NR	NR	LB	F	EGG	ESTH	EG		0.563	73
146	Kolaja, 1977	3427	DDE	Mallard duck (*Anas platyrhynchos*)	3	U	FD	7	d	NR	NR	LB	F	EGG	ESTH	EG		0.563	73
147	Longcore et al., 1971	3450	DDE	Black duck (*Anas rubripes*)	3	U	FD	28	d	NR	NR	LB	F	EGG	ESTH	EG		0.563	78
148	Longcore and Stendell, 1977	3451	DDE	Black duck (*Anas rubripes*)	2	U	FD	8	mo	NR	NR	LB	F	EGG	ESTH	EG		0.563	78
149	Vangilder and Peterle, 1980	3637	DDE	Mallard duck (*Anas platyrhynchos*)	2	U	FD	66	d	NR	NR	LB	F	EGG	ESTH	EG		0.563	78
150	Heath et al, 1969	3722	DDE	Mallard duck (*Anas platyrhynchos*)	3	U	FD	1	yr	NR	NR	LB	F	REP	RSUC	WO		0.563	78
151	Haegele and Hudson 1977	3341	DDE	Ringed turtle dove (*Streptopelia risoria*)	3	U	FD	63	d	NR	NR	SM	M	REP	COUR	NR		1.12	74
152	Peakall et al., 1973	3545	DDE	Ringed turtle dove (*Streptopelia risoria*)	2	U	FD	14	d	NR	NR	LB	F	EGG	ESTH	EG		1.13	78
153	Peakall, 1970	14926	DDT	Ringed turtle dove (*Streptopelia risoria*)	2	U	FD	29	d	NR	NR	LB	B	REP	OEGP	WO		1.14	78
154	Richie and Peterle, 1979	3570	DDT	Ringed turtle dove (*Streptopelia risoria*)	2	U	FD	90	d	NR	NR	SM	B	REP	GREP	WO		1.14	78
155	Wiemeyer and Porter, 1970	3263	DDE	American kestrel (*Falco sparverius*)	2	U	FD	1	yr	NR	NR	NR	B	EGG	ESTH	EG		1.24	78
156	Shellenberger, 1978	1111	DDT	Quail (*Coturnix japonica*)	3	U	FD	5	w	5	d	LB	F	REP	PROG	WO		1.36	78
157	Pritchard et al., 1972	3560	DDE	Duck (*Anas platyrhynchos*)	2	U	FD	2	w	NR	NR	LB	F	EGG	ESTH	EG		1.44	79
158	Risebrough and Anderson, 1975	3571	DDE	Mallard duck (*Anas platyrhynchos*)	2	M	FD	30	d	1	yr	LB	B	EGG	ESTH	EG		1.68	83
159	Lundholm, 1993	3461	DDE	Duck (*Anas platyrhynchos*)	2	U	FD	45	d	1	yr	LB	F	EGG	ESIN	EG		2.25	78
160	Greenburg et al, 1979	3330	DDE	Mallard duck (*Anas platyrhynchos*)	2	M	FD	50	d	1	yr	LB	F	EGG	GEGG	EG		2.20	83
161	Lundholm, 1980	3457	DDE	Duck (*Anas platyrhynchos*)	2	U	FD	48	d	1	y	LB	F	EGG	ESIN	EG		2.25	78
162	Lundholm, 1980	3457	DDE	Duck (*Anas platyrhynchos*)	2	U	FD	48	d	1	y	LB	F	EGG	ESIN	EG		2.25	78
163	Haegele and Hudson 1974	178	DDE	Mallard duck (*Anas platyrhynchos*)	2	U	FD	96	d	NR	NR	LB	F	EGG	ESTH	EG		2.25	78
164	Haegele et al., 1974	2668	DDE	Mallard duck (*Anas platyrhynchos*)	2	U	FD	76	d	NR	NR	LB	F	EGG	ESTH	SL		2.25	78
165	Lundholm, 1985	3462	DDE	Duck (*Anas platyrhynchos*)	2	U	FD	45	d	1	yr	LB	F	EGG	ESIN	EG		2.25	78
166	Peakall et al., 1973	3545	DDE	Duck (*Anas platyrhynchos*)	2	U	FD	14	d	NR	NR	LB	F	EGG	ESTH	EG		2.25	78
167	Jefferies 1971	3399	DDT	Bengalese Finch (*Lonchura striata*)	4	U	FD	6	w	200-300	d	LB	F	REP	PROG	WO		2.41	79
168	Jefferies 1971	3399	DDE	Bengalese Finch (*Lonchura striata*)	4	U	FD	6	w	200-300	d	LB	F	REP	PROG	WO		2.41	79
169	Kolaja and Hinton, 1979	232	DDT	Mallard duck (*Anas platyrhynchos*)	2	U	FD	6	mo	NR	NR	LB	B	EGG	EGWT	NR		2.73	72
170	McLane and Hall, 1972	3483	DDE	Screech owl (*Otus asio*)	2	U	FD	20	mo	NR	NR	LB	F	EGG	ESTH	EG		2.8	83
171	Kolaja and Hinton, 1977	3428	DDT	Mallard duck (*Anas platyrhynchos*)	2	U	FD	6	mo	NR	NR	LB	F	EGG	ESTH	EG		2.81	78
172	Kolaja and Hinton, 1976	3378	DDT	Mallard duck (*Anas platyrhynchos*)	2	U	FD	7	w	NR	NR	LB	F	EGG	ESTH	EG		4.22	78
173	Haseltine et al., 1974	3356	DDE	Ringed turtle dove (*Streptopelia risoria*)	2	U	FD	3	w	NR	NR	LB	F	EGG	ESTH	EG		4.57	78
174	Haegele and Hudson, 1973	3384	DDE	Ringed turtle dove (*Streptopelia risoria*)	2	U	FD	126	d	NR	NR	LB	B	REP	PROG	WO		4.58	78
175	Sauter and Steele, 1972	3578	DDT	Chicken (*Gallus domesticus*)	4	U	FD	10	w	NR	NR	LB	F	REP	TPRD	WO		4.94	72
176	Locke et al, 1966	14923	DDT	Bald eagle (*Haliaeetus leucocephalus*)	3	U	FD	23	d	NR	NR	NR	NR	REP	TEDG	TE		5.19	74
177	Genelly and Rudd, 1956	14920	DDT	Ring-necked pheasant (*Phasianus colchicus*)	3	U	FD	10	w	NR	NR	LB	F	REP	DEYO	WO		6.02	79
178	Chang and Stokstad, 1975	71	DDE	Japanese quail (*Coturnix japonica*)	3	U	FD	14	w	2	w	LB	F	EGG	ESTH	EG		6.29	79
179	Balasubramaniam and Sundarara	3169	DDT	Chicken (*Gallus domesticus*)	4	U	OR	24	w	4	w	JV	M	REP	TEDG	TE		12.5	86
180	Cecil et al., 1971	3218	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	74	d	39	d	LB	F	REP	NSTI	WO		13.0	78
181	Cecil et al., 1971	3218	DDE	Japanese quail (*Coturnix japonica*)	2	U	FD	74	d	39	d	LB	F	REP	NSTI	WO		13.0	78
182	DeWitt, 1955	14917	DDT	Quail (*Coturnix japonica*)	2	U	FD	120	d	NR	NR	LB	F	REP	HTCH	WO		13.8	83
183	Britton et. al. 1974	3205	DDT	Chicken (*Gallus domesticus*)	3	U	FD	133	d	12	mo	LB	F	REP	PRWT	WO		14.8	78
184	Jones and Summers 1968	3409	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	14	d	NR	NR	LB	F	REP	RSUC	WO		36.0	83
				Growth (GRO)															
185	Cecil et al., 1978	3220	DDT	Chicken (*Gallus domesticus*)	4	U	FD	30	d	11	mo	SM	M	GRO	BDWT	WO	0.227	2.27	77
186	Lillie et al., 1973	3440	DDT	Chicken (*Gallus domesticus*)	3	U	FD	40	w	26	w	SM	F	GRO	BDWT	WO	0.558	2.79	82
187	Greichus and Hannon 1973	3332	DDT	Double Crested Cormorants (*Phalacrocorax auritus*)	4	U	FD	9	w	NR	NR	JV	B	GRO	BDWT	WO	1.10		68
188	Lillie et al., 1972	3442	DDE	Chicken (*Gallus domesticus*)	4	U	FD	28	w	26	w	SM	F	GRO	BDWT	WO	1.47	2.95	84
189	Lillie et al., 1973	3440	DDT	Chicken (*Gallus domesticus*)	3	U	FD	40	w	26	w	SM	F	GRO	BDWT	WO	1.93		69
190	Lillie et al., 1972	3442	DDT	Chicken (*Gallus domesticus*)	4	U	FD	28	w	26	w	SM	F	GRO	BDWT	WO	2.99		78
191	Lillie et al., 1972	3442	DDT	Chicken (*Gallus domesticus*)	4	U	FD	28	w	26	w	SM	F	GRO	BDWT	WO	3.01		78
192	Davison and Sell 1972	944	DDT	Chicken (*Gallus domesticus*)	3	U	FD	12	w	30	w	JV	F	GRO	BDWT	WO	9.85		77
193	Chang and Stokstad, 1975	71	DDT	Japanese quail (*Coturnix japonica*)	3	U	FD	5	w	2	w	JV	F	GRO	BDWT	WO	11.5		77
194	Bunyan et al., 1972	3209	DDE	Japanese quail (*Coturnix japonica*)	4	U	FD	21	d	4	w	JV	F	GRO	BDWT	WO	12.2		77
195	Bunyan et al., 1972	3209	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	21	d	4	w	JV	F	GRO	BDWT	WO	12.3		77
196	Sifri et al., 1975	3591	DDT	Mallard duck (*Anas platyrhynchos*)	2	U	FD	14	d	8	d	JV	B	GRO	BDWT	WO	13.4		67
197	Sifri et al., 1975	3591	DDT	Chicken (*Gallus domesticus*)	2	U	FD	14	d	8	d	JV	B	GRO	BDWT	WO	13.8		67
198	Waibel et al., 1972	3642	DDT	Chicken (*Gallus domesticus*)	2	U	FD	30	d	9	mo	JV	F	GRO	BDWT	WO	14.1		68
199	Robson et al., 1976	3575	DDE	Japanese quail (*Coturnix japonica*)	3	U	FD	168	d	1	d	JV	F	GRO	BDWT	WO	14.2	42.5	84
200	Robson et al., 1976	3575	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	168	d	1	d	JV	F	GRO	BDWT	WO	16.4		69
201	Bunyan and Page, 1973	3208	DDE	Japanese quail (*Coturnix japonica*)	2	U	FD	21	d	4	w	JV	F	GRO	BDWT	WO	18.0		77
202	Chang and Stokstad, 1975	71	DDT	Japanese quail (*Coturnix japonica*)	3	U	FD	5	w	2	w	JV	F	GRO	BDWT	WO	21.1		68
203	Chang and Stokstad, 1975	71	DDE	Japanese quail (*Coturnix japonica*)	5	U	FD	5	w	F	C	JV	F	GRO	BDWT	WO	22.4		77
204	Sullivan and Scanlon, 1991	3615	DDT	Northern bobwhite quail (*Colinus virginianus*)	2	U	GV	56	d	NR	NR	NR	F	GRO	BDWT	WO	25.0		68
205	Davison et al 1976	3239	DDE	Japanese quail (*Coturnix japonica*)	5	U	FD	13	w	14	w	JV	F	GRO	BDWT	WO	25.0		69
206	Chang and Stokstad, 1975	71	DDE	Japanese quail (*Coturnix japonica*)	3	U	FD	5	w	2	w	JV	F	GRO	BDWT	WO	25.1		68
207	Sell et al., 1972	3583	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	22	d	0	d	JV	B	GRO	BDWT	WO	28.5		77
208	Bunyan and Page, 1973	3208	DDMU	Japanese quail (*Coturnix japonica*)	4	U	FD	21	d	4	w	JV	F	GRO	BDWT	WO	30.7		77
209	Genelly and Rudd, 1955	14919	DDT	Ring-necked pheasant (*Phasianus colchicus*)	6	U	FD	90	d	6	mo	JV	F	GRO	BDWT	WO	35.6		67
210	Cooke, 1970	14916	DDT	Japanese quail (*Coturnix coturnix*)	2	U	GV	3	w	73	d	JV	M	GRO	BDWT	WO	37.6		79

Table 5.1 Avian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
DDT and Metabolites
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Result #	Reference	Ref No.	Form	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
211	Greichus and Hannon 1973	11434	DDT	White pelican (*Pelecanus erythrorhynchos*)	2	U	FD	10	w	NR	NR	JV	B	GRO	BDWT	WO	72.0		72
212	Lillie et al., 1973	3440	DDT	Chicken (*Gallus domesticus*)	3	U	FD	40	w	26	w	SM	F	GRO	BDWT	WO		0.592	78
213	Chura and Stewart 1967	3766	DDT	Bald eagle (*Haliaeetus leucocephalus*)	5	U	FD	55	d	NR	NR	JV	B	GRO	BDWT	WO		0.713	78
214	Mahoney 1975	14896	DDT	White Throated Sparrow (*Zonotrichia albicollis*)	3	U	FD	6	w	NR	NR	NR	NR	GRO	BDWT	WO		1.04	72
215	Arscott et al 1972	3166	DDT	Chicken (*Gallus domesticus*)	2	U	FD	32	w	NR	NR	SM	M	GRO	BDWT	WO		3.08	71
216	Genelly and Rudd, 1955	14919	DDT	Ring-necked pheasant (*Phasianus colchicus*)	3	U	FD	74	d	6	mo	JV	F	GRO	BDWT	WO		6.02	77
217	Genelly and Rudd, 1956	14920	DDT	Ring-necked pheasant (*Phasianus colchicus*)	3	U	FD	10	w	NR	NR	SM	F	GRO	BDWT	WO		6.02	77
218	Sifri et al., 1975	3591	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	14	d	8	d	JV	B	GRO	BDWT	WO		13.0	76
219	DeWitt, 1955	14917	DDT	Quail (*Coturnix japonica*)	2	U	FD	3	w	NR	NR	JV	NR	GRO	BDWT	WO		18.9	77
220	Silver and Alpern, 1979	3592	DDT	Chicken (*Gallus domesticus*)	2	U	FD	3	w	8	d	JV	NR	GRO	BDWT	WO		42.5	77
	Survival (MOR)																		
221	Mendenhall et al., 1983	1042	DDE	Barn owl (*Tyto alba*)	2	M	FD	1	yr	1.5- 6	yr	MA	B	MOR	MORT	WO	0.211		82
222	Locke et al, 1966	14923	DDT	Bald Eagle (*Haliaeetus leucocephalus*)	2	U	FD	120	d	NR	NR	NR	NR	MOR	MORT	WO	0.324		73
223	Davison et al 1976	3239	DDT	Japanese quail (*Coturnix japonica*)	4	U	FD	16	w	9	w	JV	F	MOR	MORT	WO	0.325	1.30	81
224	Azevedo et al., 1965	3801	DDT	Pheasant (*Phasianus colchicus*)	4	UX	FD	103	d	NR	NR	AD	M	MOR	MORT	WO	0.411	4.51	85
225	Chura and Stewart 1967	3766	DDT	Bald eagle (*Haliaeetus leucocephalus*)	2	U	FD	120	d	NR	NR	JV	B	MOR	MORT	WO	0.713		79
226	Davison and Sell, 1974	942	DDT	Duck (*Anas platyrhynchos*)	4	U	FD	343	d	2	yr	AD	F	MOR	MORT	WO	0.754	7.54	75
227	Mahoney 1975	14896	DDT	White Throated Sparrow (*Zonotrichia albicollis*)	3	U	FD	11	w	NR	NR	NR	NR	MOR	MORT	WO	1.04	5.21	77
228	Greichus and Hannon 1973	3332	DDT	Double Crested Cormorants (*Phalacrocorax auritus*)	4	U	FD	9	w	NR	NR	JV	F	MOR	MORT	WO	1.10		69
229	Jefferies and French 1971	14921	DDT	Homing Pigeon (*Columba livia*)	6	U	OR	56	d	NR	NR	AD	B	MOR	MORT	WO	1.42	2.85	78
230	Lillie et al., 1972	3442	DDT	Chicken (*Gallus domesticus*)	4	U	FD	28	w	26	w	SM	F	MOR	MORT	WO	1.46	2.93	85
231	Lillie et al., 1973	3440	DDT	Chicken (*Gallus domesticus*)	3	U	FD	40	w	26	w	SM	F	MOR	MORT	WO	1.93		70
232	Davison and Sell, 1974	942	DDT	Duck (*Anas platyrhynchos*)	4	U	FD	167	d	2	yr	AD	F	MOR	MORT	WO	2.03	20.3	75
233	Haegele et al., 1974	2668	DDE	Mallard duck (*Anas platyrhynchos*)	2	U	FD	85	d	NR	NR	SM	F	MOR	MORT	WO	2.25		70
234	Cecil et al., 1978	3220	DDT	Chicken (*Gallus domesticus*)	4	U	FD	30	d	11	mo	SM	M	MOR	MORT	WO	2.27	22.7	78
235	Lillie et al., 1973	3440	DDT	Chicken (*Gallus domesticus*)	3	U	FD	40	w	26	w	SM	F	MOR	SURV	WO	2.72		70
236	Lillie et al., 1973	3440	DDT	Chicken (*Gallus domesticus*)	2	U	FD	28	w	72	w	SM	F	MOR	SURV	WO	2.74		70
237	Lillie et al., 1973	3440	DDT	Chicken (*Gallus domesticus*)	3	U	FD	40	w	26	w	SM	F	MOR	SURV	WO	2.74		70
238	Arscott et al 1972	3166	DDT	Chicken (*Gallus domesticus*)	2	U	FD	32	w	NR	NR	SM	M	MOR	MORT	WO	3.08		72
239	Dieter, 1975	3254	DDE	Starling (*Sturnus vulgaris*)	3	U	FD	7	w	NR	NR	NR	M	MOR	MORT	WO	3.44	13.8	77
240	Haegele and Hudson, 1973	3384	DDE	Ringed turtle dove (*Streptopelia risoria*)	2	U	FD	126	d	NR	NR	AD	F	MOR	SURV	WO	4.58		77
241	DeWitt, 1955	14917	DDT	Pheasant (*Phasianus colchicus*)	2	U	FD	120	d	1	d	JV	B	MOR	MORT	WO	4.6		73
242	Locke et al, 1966	14923	DDT	Bald eagle (*Haliaeetus leucocephalus*)	3	U	FD	23	d	NR	NR	NR	NR	MOR	MORT	WO	5.19	130	75
243	Davison et al 1976	3239	DDT	Japanese quail (*Coturnix japonica*)	4	U	FD	12	w	9	w	JV	F	MOR	MORT	WO	5.20		77
244	Genelly and Rudd, 1955	14919	DDT	Ring-necked pheasant (*Phasianus colchicus*)	3	U	FD	74	d	6	mo	JV	B	MOR	MORT	WO	6.02	21.9	82
245	Simpson et al., 1972	3593	DDT	Turkey (*Meleagris gallopavo*)	2	U	FD	15	w	6	w	JV	M	MOR	MORT	WO	6.09		77
246	Simpson et al., 1972	3593	DDT	Turkey (*Meleagris gallopavo*)	2	U	FD	15	w	6	w	JV	M	MOR	MORT	WO	6.09		77
247	Chang and Stokstad, 1975	71	DDE	Japanese quail (*Coturnix japonica*)	3	U	FD	14	w	2	w	JV	F	MOR	MORT	WO	6.3	25.1	82
248	Jefferies 1971	3399	DDT	Bengalese Finch (*Lonchura striata*)	4	U	FD	6	w	200-300	d	SM	B	MOR	MORT	WO	9.84	85.3	82
249	DeWitt, 1955	14917	DDT	Quail (*Coturnix japonica*)	2	U	FD	120	d	1	d	JV	B	MOR	MORT	WO	10.5		73
250	DeWitt, 1955	14917	DDT	Quail (*Coturnix japonica*)	2	U	FD	10	w	NR	NR	JV	NR	MOR	SURV	WO	11.0		69
251	Chang and Stokstad, 1975	71	DDT	Japanese quail (*Coturnix japonica*)	3	U	FD	5	w	2	w	JV	F	MOR	MORT	WO	11.5		78
252	Davison and Sell, 1974	942	DDT	Duck (*Anas platyrhynchos*)	5	U	FD	3	mo	1	yr	AD	F	MOR	SURV	WO	11.8		70
253	Jefferies 1971	3399	DDE	Bengalese Finch (*Lonchura striata*)	4	U	FD	6	w	250	d	SM	B	MOR	MORT	WO	11.9	59.4	78
254	Gillett and Arscott, 1969	975	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	23	w	4	w	JV	M	MOR	MORT	WO	13.5		77
255	Dieter 1974	77	DDE	Quail (*Coturnix japonica*)	4	U	FD	12	w	2	mo	SM	M	MOR	MORT	WO	13.5		77
256	Kreitzer and Heinz, 1974	3362	DDT	Quail (*Coturnix japonica*)	2	U	FD	8	d	0	d	JV	NR	MOR	MORT	WO	13.6		68
257	DeWitt, 1955	14917	DDT	Quail (*Coturnix japonica*)	3	U	FD	45	d	NR	NR	AD	B	MOR	MORT	WO	13.8	25.0	84
258	Robson et al., 1976	3575	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	168	d	1	d	JV	F	MOR	MORT	WO	14.2	43.5	85
259	Van Velzen et al., 1972	3634	DDT	Cowbird (*Molothrus ater*)	2	U	FD	13	d	NR	NR	NR	M	MOR	MORT	WO	16.7		73
260	Chang and Stokstad, 1975	71	DDT	Japanese quail (*Coturnix japonica*)	3	U	FD	5	w	2	w	JV	F	MOR	MORT	WO	21.1		78
261	Genelly and Rudd, 1955	14919	DDT	Ring-necked pheasant (*Phasianus colchicus*)	6	U	FD	90	d	6	mo	JV	F	MOR	MORT	WO	23.7	35.6	83
262	Smith et al., 1969	3595	DDT	Japanese quail (*Coturnix japonica*)	4	U	FD	10	d	8	w	JV	B	MOR	MORT	WO	25.7	51.5	83
263	Lehman et al., 1975	3438	DDT	Bobwhite quail (*Colinus virginianus*)	5	U	FD	242	d	29	d	JV	F	MOR	MORT	WO	26.8		77
264	Britton, 1975	3204	DDT	Chicken (*Gallus domesticus*)	4	U	FD	84	d	19	mo	AD	F	MOR	MORT	WO	29.0	58.1	79
265	Jefferies and French, 1969	3400	DDT	Homing Pigeon (*Columba livia*)	4	U	OR	42	d	NR	NR	AD	B	MOR	MORT	WO	36.1		81
266	Friend and Trainer, 1974	3301	DDT	Mallard duck (*Anas platyrhynchos*)	5	U	FD	10	d	5	d	JV	B	MOR	MORT	WO	66.2	132	83
267	DeWitt et al 1955	3763	DDT	Starling (*Sturnus vulgaris*)	7	U	GV	5	d	NR	NR	JV	NR	MOR	MORT	WO	100	200	91
268	Lillie et al., 1972	3442	DDE	Chicken (*Gallus domesticus*)	4	U	FD	28	w	26	w	SM	F	MOR	MORT	WO		0.293	79
269	Dasadhikari, et al, 1996	3157	DDD	pigeon (*Coumba livia*)	2	U	OR	5	d	NR	NR	AD	NR	MOR	MORT	WO		0.294	73
270	Lillie et al., 1972	3442	DDT	Chicken (*Gallus domesticus*)	4	U	FD	28	w	26	w	SM	F	MOR	MORT	WO		0.298	79
271	Chura and Stewart 1967	3766	DDT	Bald eagle (*Haliaeetus leucocephalus*)	5	U	FD	77	d	NR	NR	AD	B	MOR	MORT	WO		0.713	79
272	Wiemeyer et al, 1986	3662	DDE	American kestrel (*Falco sparverius*)	2	U	FD	1	yr	NR	NR	AD	F	MOR	MORT	WO		1.10	78
273	DeWitt, 1955	14917	DDT	Pheasant (*Phasianus colchicus*)	2	U	FD	18	d	NR	NR	AD	B	MOR	MORT	WO		11.5	75
274	Robson et al., 1976	3575	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	168	d	1	d	JV	M	MOR	MORT	WO		18.0	79
275	Sell et al., 1972	3583	DDT	Japanese quail (*Coturnix japonica*)	2	U	FD	22	d	0	d	JV	B	MOR	MORT	WO		28.5	78
276	Friend and Trainer, 1974	3301	DDT	Mallard duck (*Anas platyrhynchos*)	5	U	FD	10	d	30	d	JV	B	MOR	MORT	WO		37.8	77
277	Friend and Trainer, 1974	3301	DDT	Mallard duck (*Anas platyrhynchos*)	5	U	FD	10	d	NR	NR	AD	M	MOR	MORT	WO		55.7	73
278	Stickel et. al., 1966	3726	DDT	Cowbird (*Molothrus ater*)	2	U	FD	8	d	NR	NR	NR	NR	MOR	MORT	WO		76.0	70

Table 5.1 Avian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
DDT and Metabolites
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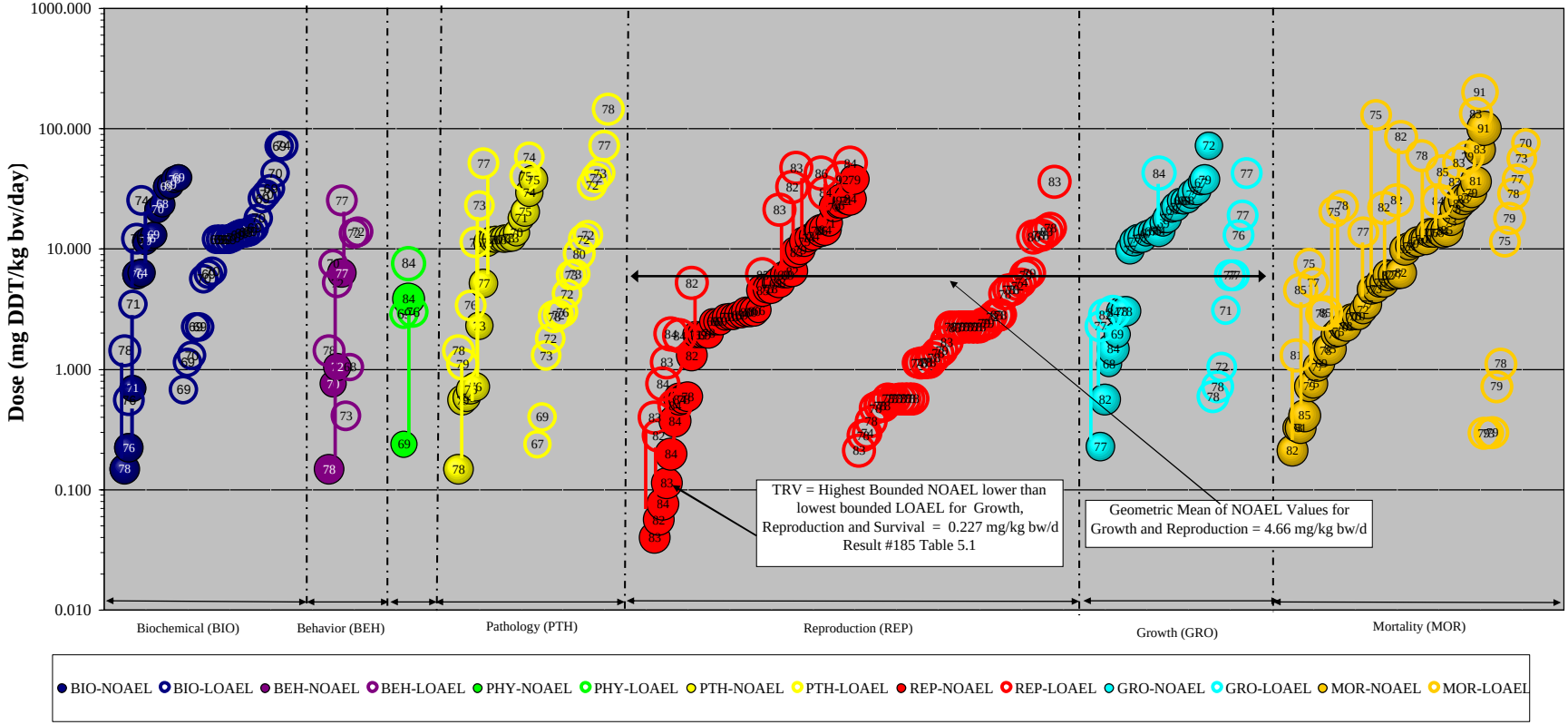
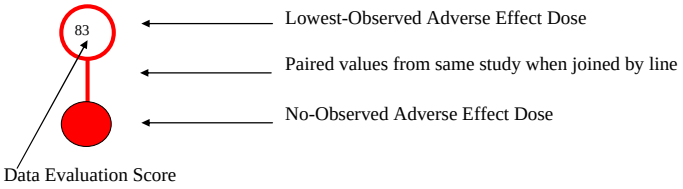
Result #	Reference	Ref No.	Form	Test Organism	# of Conc/ Doses	Method of Analyses	Route of Exposure	Exposure Duration	Duration Units	Age	Age Units	Lifestage	Sex	Effect Type	Effect Measure	Response Site	NOAEL Dose* (mg/kg bw/day)	LOAEL Dose* (mg/kg bw/day)	Data Evaluation Score

AD = adult; AEPX =aldrin epoxidase; AHDX = aniline hydroxylase; AR = adrenal; B = both; BDWT = body weight; BEH = behavior; BL = blood; BR = brain; BTMP = body temperature; CAAH = carbonic anhydrase; CALC = calcium; CHM = chemical changes; CEST = cholinesterase; CRAK = eggshell cracking; CRKI = creatine kinase; CTYP = percent cell type; COUR = courtship behavior; d = days; DEYO = death young; DOPA = dopamine; DR = drinking water; EDMA = edema; EG = egg; ENZ = enzyme changes; EQUL = balance and equilibrium; ESDL = ; ESIN = eggshell index; ESQU = eggshell quality; ESTH = eggshell thinning; ESWT = eggshell weight; F = female; FCNS = food consumption; FD = food; FDB = feeding behavior; FERT = fertility; FTEG = fertile egg; GENZ = general enzyme; G6PD = glucose-6-phosphate dehydrogenase; GEGG = general egg effect; GHIS = general histology; GITX = general intoxication; GOTR = glutamic-oxaloacetic transaminase; GGRO = general growth changes; GREP = general reproduction; GRO = growth; GRS = gross morphology; GV = gavage; HE = heart; HIS = histology; HRM = hormone changes; HTCH = hatch; HTRT = heartrate; INST = induced sleeping time; ITX = intoxication; JV = juvenile; LB = laying bird: LI = liver: LIPD = lipid content: LOAEL = lowest observed adverse effect level: M = measured: M = male: MCPR = mo = months: MOR = mortality. MORT = mortality: NMVM = number of move NOAEL = no observed adverse effect level; NOPN = number of organisms per nest; NR = Not reported; NSTI = nest initiation; OEGP = onset of egg production; OR = oral; ORW = organ weight changes; ORWT = organ weight; PHY = physiology; PI = pituitary gland; PL = plasma; P450= cytochrome P450; PROG = progeny counts; PRTL = protein level; PRWT = progeny weight; REP = reproduction; RHIS = reproductive histology; RSUC = reproductive success; RT = reproductive tract; SG = shell gland; SM = sexually mature; SMIX = in relation to body weight; SPCV = sperm counts; SR = serum; SURV = survival; TEDG = testes degeneration; TEWT = testes weight; TPRD = total production; TE = testes; TY = ; U = unmeasured; UX = measured but results not reported; VTMA = Vitamin A; w = weeks; WO = whole organism; yr = years.

*NOAEL and LOAEL values that are equal and from the same reference represent different experimental designs.

Figure 5.1 Avian TRV Derivation for DDT and Metabolites





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 within the growth and reproduction effect groups for calculation of a geometric mean.

3) The geometric mean is equal to 4.66 mg DDT/kg bw/d and is higher than the lowest bounded LOAEL for results within the reproduction, growth, and survival (MOR) effect groups.

4) The avian wildlife TRV for DDT is equal to 0.227 mg DDT/kg bw/day which is the highest bounded NOAEL lower than the lowest bounded LOAEL for reproduction, growth or survival.

Table 5.2 Calculation of the Avian Eco-SSLs for DDT (and metabolites)						
Surrogate Receptor Group	**TRV for DDT (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 DDT in Biota Type (i)[2,3] (B_i) (mg/kg dw)**	**DDT in Diet of Prey [4] (C_{diet})**	**Eco-SSL (mg/kg dw)[5]**
Avian herbivore (dove)	0.227	0.190	0.139	$\ln(B_i) = 0.7524 * \ln(Soil_j) - 2.5119$	NA	6.3
Avian ground insectivore (woodcock)	0.227	0.214	0.164	$B_i = 11.2 * Soil_j$ where i = earthworms	NA	0.093
Avian carnivore (hawk)	0.227	0.0353	0.057	$B_i = 4.83 * C_{diet}$ where i = mammals	$C_{diet} = 11.2 * Soil_j$	0.12

[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] C_{diet} = Concentration in the diet of small mammals consumed by predatory species (weasel).
[5] 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

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 completed according to the Eco-SSL guidance (U.S. EPA, 2003; Attachment 4-2) identified 1,149 papers with possible toxicity data for DDT (and metabolites) for either avian or mammalian species. Of these papers, 977 were rejected for use as described in Section 7.5. Of the remaining papers, 73 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 and 4-4). 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 77 papers there are 212 results for biochemical (BIO), behavior (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 growth and reproduction was calculated at 7.65 mg DDT (and metabolites) /kg bw/day. However, this value is higher than the lowest bounded LOAEL for either reproduction, growth, or survival. Therefore, the TRV is equal to the highest bounded NOAEL below the lowest bounded LOAEL for reproduction, growth, or survival and is equal to 0.147 mg DDT (and metabolites) /kg bw/day.

6.2 Estimation of Dose and Calculation of the Eco-SSL

Three separate Eco-SSL values were calculated for mammalian wildlife, one for each of three surrogate species representing different trophic groups. The mammalian Eco-SSLs derived for DDT (and metabolites) were 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)
DDT and Metabolites (DDE, DDD, DDE, DDMU, DDA)

Result #	Reference	Ref No.	Form	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)	Total
Biochemical (BIO)																			
1	Martin et al., 1976	3470	DDT	Rat (*Rattus norvegicus*)	5	UX	FD	120	d	NR	NR	JV	B	ENZ	GENZ	LI	0.197		66
2	Hoffman et al., 1970	3380	DDT	Rat (*Rattus norvegicus*)	15	U	FD	14	d	NR	NR	JV	M	ENZ	PNAD	LI	0.353	0.705	76
3	Wrenn et al., 1970	3670	DDT	Rat (*Rattus norvegicus*)	2	U	GV	15	d	18	d	JV	F	CHM	GLYC	UT	0.694		73
4	Wrenn et al., 1970	3670	DDT	Rat (*Rattus norvegicus*)	3	U	GV	15	d	18	d	JV	F	CHM	GLYC	UT	0.735		73
5	Dinu et al 1974	3256	DDT	Rat (*Rattus norvegicus*)	2	U	FD	72	d	NR	NR	JV	F	ENZ	ALDO	LI	1.42		71
6	Cecil et al., 1971	3349	DDT	Rat (*Rattus norvegicus*)	6	U	FD	7	d	22	d	JV	F	CHM	GLYC	UT	7.62	19.0	77
7	Thomas, 1974	1133	DDT	Mouse (*Mus musculus*)	4	U	GV	10	d	NR	NR	AD	M	HRM	GHRM	PG	12.5	25.0	79
8	Bunyan et al., 1972	3209	DDT	Rat (*Rattus norvegicus*)	2	U	FD	21	d	NR	NR	JV	M	CHM	MCPR	LI	13.6		66
9	Attia et al 1995	3811	DDT	Rat (*Rattus norvegicus*)	2	U	GV	6	d	NR	mo	JV	M	CHM	PORP	HG	22.6		68
10	Clement and Okey 1972	3226	DDT	Rat (*Rattus norvegicus*)	5	U	FD	7	d	23	d	JV	F	CHM	GLYC	UT	47.8	95.6	75
11	Leavens et al, 2002	20970	DDE	Rat (*Rattus norvegicus*)	6	U	GV	5	d	71	d	JV	M	HRM	TSTR	SR	99.0		71
12	Tinsley, 1965	3630	DDT	Rat (*Rattus norvegicus*)	4	U	FD	4	w	6	w	JV	B	ENZ	G6PD	LI		0.518	70
13	Dinu et al 1974	3256	DDT	Rat (*Rattus norvegicus*)	2	U	FD	72	d	4	w	JV	M	ENZ	GLRE	LI		1.27	71
14	Dinu et al 1974	3256	DDT	Rat (*Rattus norvegicus*)	2	U	FD	72	d	NR	NR	JV	F	ENZ	ALDO	LI		1.50	71
15	Banerjee et al., 1983	3171	DDT	Rat (*Rattus norvegicus*)	2	U	FD	1	yr	NR	NR	JV	M	ENZ	ALPH	LI		1.77	70
16	Gillett, 1969	3320	DDT	Rat (*Rattus norvegicus*)	2	U	FD	2	w	28	d	JV	M	ENZ	GENZ	LI		2.25	69
17	Cecil et al, 1975	3221	DDT	Sheep (*Ovis aries*)	2	U	FD	17	w	1	yr	JV	F	ENZ	AHDX	LI		2.57	70
18	Bunyan et al., 1972	3209	DDE	Rat (*Rattus norvegicus*)	4	U	FD	21	d	NR	NR	JV	M	CHM	MCPR	LI		4.55	70
19	Tinsley, 1965	3630	DDT	Rat (*Rattus norvegicus*)	3	U	FD	4	w	5-6	w	JV	B	ENZ	G6PD	LI		6.50	70
20	Jonsson et al., 1976	3410	DDT	Rat (*Rattus norvegicus*)	3	U	FD	36	w	NR	NR	GE	F	HRM	PRGS	PL		6.60	70
21	Orberg and Lundberg, 1974	3526	DDT	Mouse (*Mus musculus*)	2	U	OR	28	d	NR	NR	SM	M	ENZ	P450	LI		6.67	69
22	Ali and Shakoori, 1996	3163	DDT	Rat (*Rattus norvegicus*)	2	U	FD	6	mo	3	mo	JV	NR	CHM	GLUC	LI		7.50	74
23	Cecil et al, 1975	3221	DDT	Rat (*Rattus norvegicus*)	2	U	FD	20	w	60-90	d	JV	F	ENZ	APND	LI		8.22	69
24	Cecil et al., 1973	3187	DDT	Rat (*Rattus norvegicus*)	2	U	FD	2	mo	21	d	JV	B	CHM	LIPD	LI		8.41	70
25	Deichmann, 1974	947	DDT	Mouse (*Mus musculus*)	2	U	FD	260	d	4	w	GE	B	CHM	LIPD	LD		12.4	70
26	Bunyan and Page, 1973	3208	DDE	Rat (*Rattus norvegicus*)	2	U	FD	21	d	NR	NR	JV	M	CHM	PRTL	LI		13.5	70
27	Bunyan and Page, 1973	3208	DDMU	Rat (*Rattus norvegicus*)	2	U	FD	21	d	NR	NR	JV	M	ENZ	P450	LI		13.5	70
28	Ali and Shakoori, 1996	3163	DDT	Rat (*Rattus norvegicus*)	2	U	FD	6	d	5	mo	JV	NR	CHM	GLUC	LI		15.0	74
29	Yagi et. al., 1979	3672	DDT	Rat (*Rattus norvegicus*)	2	U	FD	50	d	NR	NR	JV	M	CHM	THIA	LI		47.3	70
30	Copeland and Cranmer 1974	3231	DDT	Dog (*Canis familaris*)	2	U	OR	32	d	NR	NR	AD	M	CHM	PRTL	LI		50.0	70
31	Story and Freedland, 1979	3610	DDT	Rat (*Rattus norvegicus*)	2	U	FD	2	w	NR	NR	JV	M	ENZ	GENZ	LI		90.5	70
32	McIntosh and Topham, 1972	3482	DDT	Rat (*Rattus norvegicus*)	2	U	FD	14	d	NR	NR	JV	NR	ENZ	NCCR	LI		94.2	66
33	Story and Freedland, 1979	3610	DDT	Rat (*Rattus norvegicus*)	2	U	FD	2	w	NR	NR	JV	M	CHM	THRE	LI		96.3	70
34	Platt and Cockrill, 1969	3555	DDT	Rat (*Rattus norvegicus*)	2	U	FD	14	d	NR	NR	JV	M	ENZ	NCCR	LI		96.3	70
35	You et al., 1999	3674	DDE	Rat (*Rattus norvegicus*)	2	U	GV	7	d	NR	NR	AD	M	ENZ	GENZ	LI		99.0	77
36	McIntosh and Topham, 1972	3482	DDT	Mouse (*Mus musculus*)	2	U	GV	14	d	NR	NR	AD	NR	ENZ	NCCR	LI		100	73
Behavior (BEH)																			
37	Dinu et al 1974	3256	DDT	Rat (*Rattus norvegicus*)	2	U	FD	72	d	4	w	JV	M	FDB	FCNS	WO	1.27		74
38	Dinu et al 1974	3256	DDT	Rat (*Rattus norvegicus*)	2	U	FD	72	d	NR	NR	JV	F	FDB	FCNS	WO	1.42		74
39	Dinu et al 1974	3256	DDT	Rat (*Rattus norvegicus*)	2	U	FD	72	d	NR	NR	JV	F	FDB	FCNS	WO	1.50		74
40	Nickerson and Sniffen, 1973	3510	DDT	Rat (*Rattus norvegicus*)	2	U	FD	8	w	7	w	JV	F	FDB	FCNS	WO	2.0		68
41	Peterle and Peterle, 1971	3553	DDT	Mouse (*Mus musculus*)	2	U	FD	80	d	12	w	SM	M	BEH	GBHV	WO		0.889	72
42	Rao et al., 1978	3564	DDT	Rat (*Rattus norvegicus*)	3	U	OR	8	w	NR	NR	JV	M	BEH	INST	WO		1.0	75
43	Paulsen et al 1975	3538	DDT	Rat (*Rattus norvegicus*)	3	U	FD	14	d	90-100	d	GE	F	BEH	GBEH	WO		2.0	74
44	Kimbrough et al. 1971	1020	DDT	Rat (*Rattus norvegicus*)	3	U	FD	8	w	3-4	mo	JV	M	BEH	INST	WO		12.9	77
Physiology (PHY)																			
45	Dinu et al 1974	3256	DDT	Rat (*Rattus norvegicus*)	2	U	FD	72	d	NR	NR	JV	M	PHY	FDCV	WO	1.27		73
46	Dinu et al 1974	3256	DDT	Rat (*Rattus norvegicus*)	2	U	FD	72	d	NR	NR	JV	F	PHY	FDCV	WO	1.42		74
47	Dinu et al 1974	3256	DDT	Rat (*Rattus norvegicus*)	2	U	FD	72	d	NR	NR	JV	F	PHY	FDCV	WO	1.50		74
48	Nickerson and Sniffen, 1973	3510	DDT	Rat (*Rattus norvegicus*)	2	U	FD	8	w	7	w	JV	F	PHY	FDCV	WO	2.0		68
49	Braham and Neal, 1974	3202	DDT	Short tail shrew (*Blarina brevicauda*)	2	M	FD	1	w	NR	NR	NR	M	PHY	META	WO		11.7	71
50	Laug and Fitzhugh, 1946	14715	DDT	Rat (*Rattus norvegicus*)	3	U	FD	6	mo	21	d	JV	M	PHY	GPHY	LI		62.9	72
Pathology (PTH)																			
51	Street and Sharma, 1975	3612	DDT	Rabbit (*Oryctolagus cuniculus*)	5	U	FD	57	d	NR	NR	AD	M	HIS	GHIS	VI	0.184	0.92	77
52	Treon et al, 1951	14960	DDT	Rat (*Rattus norvegicus*)	6	U	FD	16	w	NR	NR	JV	B	HIS	GHIS	LI	0.372	1.86	77
53	Treon et al, 1951	14960	DDT	Rat (*Rattus norvegicus*)	6	U	FD	16	w	NR	NR	JV	B	HIS	GHIS	LI	0.405	2.20	77
54	Tinsley, 1965	3630	DDT	Rat (*Rattus norvegicus*)	4	U	FD	4	w	6	w	JV	B	ORW	SMIX	LI	0.518	2.59	77
55	Wrenn et al., 1970	3670	DDT	Rat (*Rattus norvegicus*)	2	U	GV	15	d	18	d	JV	F	ORW	ORWT	AR	0.694		76
56	Wrenn et al., 1970	3670	DDT	Rat (*Rattus norvegicus*)	3	U	GV	15	d	18	d	JV	F	ORW	ORWT	AR	0.735		76
57	Banerjee et al., 1983	3171	DDT	Rat (*Rattus norvegicus*)	2	U	FD	1	yr	NR	NR	JV	M	ORW	SMIX	LI	1.77		69
58	Cecil et al, 1975	3221	DDT	Sheep (*Ovis aries*)	2	U	FD	17	w	1	yr	JV	F	ORW	ORWT	LI	2.57		71
59	Wilson et al., 1946	14719	DDT	Cattle (*Bos taurus*)	2	U	FD	141	d	NR	NR	AD	NR	ITX	GITX	WO	3.53		70
60	Hoffman et al., 1970	3380	DDT	Rat (*Rattus norvegicus*)	15	U	FD	14	d	NR	NR	JV	M	ORW	ORWT	LI	5.64	11.3	79
61	Kornbrust et al, 1986	3431	DDE	Rat (*Rattus norvegicus*)	2	U	GV	75	d	55	d	GE	F	ORW	SMIX	LI	7.07		80

Table 6.1
Mammalian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
DDT and Metabolites (DDE, DDD, DDE, DDMU, DDA)

Result #	Reference	Ref No.	Form	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)	Total
62	Cecil et al, 1975	3221	DDT	Rat (*Rattus norvegicus*)	2	U	FD	20	w	60-90	d	JV	F	ORW	ORWT	LI	8.22		70
63	Wassermann et al,	3652	DDT	Rat (*Rattus norvegicus*)	2	U	DR	6	w	NR	NR	JV	B	ORW	SMIX	AR	12.1		68
64	Leavens et al, 2002	20970	DDE	Rat (*Rattus norvegicus*)	6	U	GV	5	d	71	d	JV	M	ORW	ORWT	LI	12.4	24.8	89
65	Bunyan et al., 1972	3209	DDE	Rat (*Rattus norvegicus*)	4	U	FD	21	d	NR	NR	JV	M	ORW	ORWT	LI	13.7		73
66	Foster, 1968	961	DDD	Rat (*Rattus norvegicus*)	3	U	FD	42	d	NR	NR	JV	F	ORW	SMIX	AR	17.5		73
67	Foster, 1968	961	DDD	Rat (*Rattus norvegicus*)	3	U	FD	42	d	NR	NR	JV	F	ORW	SMIX	AR	17.6		73
68	Banerjee and Pasha, 1996	3172	DDA	Rat (*Rattus norvegicus*)	2	U	FD	6	w	NR	NR	JV	M	ORW	SMIX	LI	19.6		73
69	Ortega et al, 1957	3527	DDT	Rat (*Rattus norvegicus*)	7	U	FD	2	mo	NR	NR	JV	B	ORW	SMIX	LI	20.7	41.4	79
70	Wasserman and Wasserman, 197	3651	DDT	Rat (*Rattus norvegicus*)	2	U	DR	6	w	1	mo	JV	M	HIS	GHIS	AR	22.9		68
71	Clark and Stafford, 1981	73	DDE	Little brown bat (*Myotis lucifugus*)	3	M	FD	8	d	NR	NR	AD	F	ITX	GITX	WO	25.4	81.2	78
72	Clement and Okey 1972	3226	DDT	Rat (*Rattus norvegicus*)	5	U	FD	7	d	23	d	JV	F	ORW	ORWT	UT	47.8	95.6	78
73	Thomas, 1974	1133	DDT	Mouse (*Mus musculus*)	4	U	GV	10	d	NR	NR	AD	M	ORW	SMIX	PG	50.0		69
74	Chowdhury et al., 1990	3224	DDT	Rat (*Rattus norvegicus*)	2	U	GV	120	d	NR	NR	JV	M	ORW	ORWT	AR		0.20	80
75	Rao et al., 1978	3564	DDT	Rat (*Rattus norvegicus*)	3	U	OR	8	w	NR	NR	JV	M	ORW	SMIX	LI		1.0	75
76	Tinsley, 1965	3630	DDT	Rat (*Rattus norvegicus*)	3	U	FD	4	w	5-6	w	JV	B	ORW	SMIX	WO		6.50	73
77	Jonsson et al., 1981	3411	DDT	Rat (*Rattus norvegicus*)	3	U	FD	36	w	NR	NR	JV	F	HIS	NCRO	LI		6.59	73
78	Orberg and Lundberg, 1974	3526	DDT	Mouse (*Mus musculus*)	2	U	OR	28	d	NR	NR	SM	M	ORW	ORWT	LI		6.67	72
79	Ali and Shakoori, 1996	3162	DDT	Rat (*Rattus norvegicus*)	2	U	FD	6	mo	3	mo	JV	NR	HIS	CTYP	LI		7.50	77
80	Ali and Shakoori, 1996	3163	DDT	Rat (*Rattus norvegicus*)	2	U	FD	6	mo	3	mo	JV	NR	ORW	ORWT	LI		7.50	77
81	Cecil et al., 1973	3187	DDT	Rat (*Rattus norvegicus*)	2	U	FD	2	mo	21	d	JV	M	ORW	ORWT	LI		8.41	73
82	Fitzhugh and Nelson, 1947	14714	DDT	Rat (*Rattus norvegicus*)	5	U	FD	24	mo	21	d	JV	M	HIS	GLSN	LI		8.71	72
83	Kimbrough et al. 1971	1020	DDT	Rat (*Rattus norvegicus*)	3	U	FD	8	w	3-4	mo	JV	M	ORW	SMIX	LI		12.9	77
84	Bunyan and Page, 1973	3208	DDMU	Rat (*Rattus norvegicus*)	2	U	FD	21	d	NR	NR	JV	M	ORW	SMIX	LI		13.5	73
85	Bunyan et al., 1972	3209	DDT	Rat (*Rattus norvegicus*)	2	U	FD	21	d	NR	NR	JV	M	ORW	ORWT	LI		13.6	73
86	Bunyan and Page, 1973	3208	DDE	Rat (*Rattus norvegicus*)	2	U	FD	21	d	NR	NR	JV	M	ORW	SMIX	LI		14.9	73
87	Ali and Shakoori, 1996	3162	DDT	Rat (*Rattus norvegicus*)	2	U	FD	6	d	5	mo	JV	NR	HIS	CTYP	LI		15.0	77
88	Ali and Shakoori, 1996	3163	DDT	Rat (*Rattus norvegicus*)	2	U	FD	6	d	5	mo	JV	NR	ORW	ORWT	LI		15.0	77
89	Fitzhugh and Nelson, 1947	14714	DDT	Rat (*Rattus norvegicus*)	5	U	FD	18	mo	21	d	JV	B	ORW	SMIX	LI		15.3	72
90	Banerjee and Pasha, 1996	3172	DDD	Rat (*Rattus norvegicus*)	2	U	FD	6	w	NR	NR	JV	M	ORW	SMIX	LI		19.4	73
91	Banerjee and Pasha, 1996	3172	DDT	Rat (*Rattus norvegicus*)	2	U	FD	6	w	NR	NR	JV	M	ORW	SMIX	LI		19.4	73
92	Banerjee and Pasha, 1996	3172	DDE	Rat (*Rattus norvegicus*)	2	U	FD	6	w	NR	NR	JV	M	ORW	SMIX	LI		19.5	73
93	Wassermann et al,	3652	DDT	Rat (*Rattus norvegicus*)	2	U	DR	5	w	NR	NR	JV	B	ORW	SMIX	LI		23.4	68
94	Clark and Kroll 1977	74	DDE	Free-tailed bat (*Tadarida brasiliensis*)	2	M	FD	40	d	NR	NR	AD	F	GRS	BDWT	WO		31.9	71
95	Fonseca et al 1986	3286	DDT	Rat (*Rattus norvegicus*)	2	U	FD	2	mo	NR	NR	JV	F	HIS	USTR	BR		37.2	73
96	Cannon and Holcomb, 1968	3214	DDT	Mouse (*Mus musculus*)	3	U	FD	55	d	4-5	mo	JV	M	ITX	GITX	WO		39.8	74
97	Yagi et. al., 1979	3672	DDT	Rat (*Rattus norvegicus*)	2	U	FD	50	d	NR	NR	JV	M	ORW	ORWT	LI		47.3	73
98	Copeland and Cranmer 1974	3231	DDT	Dog (*Canis familaris*)	2	U	OR	32	d	NR	NR	AD	M	ORW	ORWT	AR		50.0	73
99	Laug and Fitzhugh, 1946	14715	DDT	Rat (*Rattus norvegicus*)	3	U	FD	6	mo	21	d	JV	M	ORW	ORWT	LI		62.9	72
100	McIntosh and Topham, 1972	3482	DDT	Rat (*Rattus norvegicus*)	2	U	FD	14	d	NR	NR	JV	NR	ORW	SMIX	LI		94.2	73
101	Platt and Cockrill, 1969	3555	DDT	Rat (*Rattus norvegicus*)	2	U	FD	14	d	NR	NR	JV	M	ORW	SMIX	LI		96.3	73
102	You et al., 1999	3674	DDE	Rat (*Rattus norvegicus*)	2	U	GV	7	d	NR	NR	AD	M	ORW	ORWT	LI		99.0	80
103	McIntosh and Topham, 1972	3482	DDT	Mouse (*Mus musculus*)	2	U	GV	14	d	NR	NR	AD	NR	ORW	SMIX	LI		100	76
	Reproduction (REP)																		
104	Wrenn et al., 1970	3670	DDT	Rat (*Rattus norvegicus*)	3	U	FD	168	d	1	d	JV	B	REP	ORWT	OV	0.110	0.274	85
105	Wrenn et al., 1970	3670	DDT	Rat (*Rattus norvegicus*)	2	U	GV	15	d	18	d	JV	F	REP	GREP	WO	0.139	0.694	86
106	Wrenn et al., 1970	3670	DDT	Rat (*Rattus norvegicus*)	3	U	GV	15	d	18	d	JV	F	REP	GREP	WO	0.147	0.735	86
107	Wrenn et al., 1971	3669	DDT	Sheep (*Ovis aries*)	2	U	FD	9	mo	18-19	mo	GE	F	REP	GREP	WO	0.371		74
108	Ware and Good, 1967	3649	DDT	Mouse (*Mus musculus*)	2	U	FD	120	d	6	w	GE	B	REP	FERT	WO	0.731		78
109	Wrenn et al., 1971	3668	DDT	Rat (*Rattus norvegicus*)	5	U	FD	17	w	21	d	GE	F	REP	GREP	WO	0.894	1.79	85
110	Seiler et al, 1994	3582	DDT	Rabbit (*Oryctolagus cuniculus*)	2	U	GV	116	d	NR	NR	GE	F	REP	PROG	WO	1.30		77
111	Ottoboni, 1972	3530	DDT	Rat (Rattus norvegicus)	2	U	FD	23	mo	21	d	GE	F	REP	PROG	WO	1.65		70
112	Clement and Okey 1974	3227	DDT	Rat (*Rattus norvegicus*)	4	U	FD	8	mo	80-100	d	GE	F	REP	PRWT	WO	1.71	17.1	82
113	Treon et al, 1954	14965	DDT	Rat (*Rattus norvegicus*)	4	U	FD	120	d	28	d	GE	F	REP	FERT	WO	2.28		69
114	Wolfe et al., 1979	3666	DDT	Field mouse (*Peromyscus polionotus*)	3	U	FD	15	mo	60	d	JV	B	REP	PROG	WO	2.40		74
115	Cecil et al, 1975	3221	DDT	Sheep (*Ovis aries*)	2	U	FD	17	w	1	yr	JV	F	REP	GREP	UT	2.57		75
116	Ledoux et al., 1977	3437	DDT	Mouse (*Mus musculus*)	5	U	FD	84	d	7	w	GE	F	REP	PRWT	WO	5.1		78
117	Orberg and Lundberg, 1974	3526	DDT	Mouse (*Mus musculus*)	2	U	OR	28	d	NR	NR	SM	M	REP	TEWT	TE	6.7		78
118	Kornbrust et al, 1986	3431	DDE	Rat (*Rattus norvegicus*)	2	U	GV	75	d	55	d	GE	F	REP	GSTT	WO	7.07		86
119	Cecil et al., 1971	3349	DDT	Rat (*Rattus norvegicus*)	6	U	FD	7	d	22	d	JV	F	REP	GREP	UT	7.62	19.0	86
120	You et al., 1999	3674	DDE	Rat (*Rattus norvegicus*)	3	U	GV	5	d	NR	NR	GE	F	REP	OTHR	PY	9.90	99.0	90
121	Loeffler and Peterson, 1999	3448	DDE	Rat (*Rattus norvegicus*)	6	U	GV	5	d	NR	NR	GE	F	REP	ODVP	WO	10.0	50.0	90
122	Deichmann, 1974	947	DDT	Mouse (*Mus musculus*)	2	U	FD	260	d	4	w	GE	B	REP	PRWT	WO	12.4		79
123	Clement and Okey 1974	3227	DDT	Rat (*Rattus norvegicus*)	4	U	FD	8	mo	80-100	d	GE	F	REP	PRWT	WO	17.1	85.3	82
124	Ottoboni, 1969	3529	DDT	Rat (*Rattus norvegicus*)	3	UX	FD	117	d	21	d	GE	B	REP	RSUC	WO	17.2		74
125	Bernard and Gaertner, 1964	3802	DDT	Mouse (*Mus musculus*)	5	U	FD	50	d	4	mo	GE	F	REP	RSUC	WO	25.8	38.8	84

Table 6.1
Mammalian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
DDT and Metabolites (DDE, DDD, DDE, DDMU, DDA)
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Result #	Reference	Ref No.	Form	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)	Total
126	Hayes, 1976	3865	DDT	Rat (*Rattus norvegicus*)	2	U	FD	116	d	21	d	GE	F	REP	DEYO	WO	32.2		74
127	Clement and Okey 1972	3226	DDT	Rat (*Rattus norvegicus*)	5	U	FD	7	d	23	d	JV	F	REP	PVOP	WO	47.8	95.6	84
128	Thomas, 1974	1133	DDT	Mouse (*Mus musculus*)	4	U	GV	10	d	NR	NR	AD	M	REP	TEWT	TE	50.0		78
129	Cannon and Holcomb, 1968	3214	DDT	Mouse (*Mus musculus*)	3	U	FD	55	d	4-5	mo	JV	M	REP	TEWT	TE	60.7		71
130	Leavens et al, 2002	20970	DDE	Rat (*Rattus norvegicus*)	6	U	GV	5	d	71	d	JV	M	REP	RHIS	PG	99		80
131	Palanza et al., 1999	3533	DDT	Mouse (*Mus musculus*)	6	U	FD	7	d	NR	NR	GE	B	REP	PBEH	WO	100		74
132	Naishtein and Leibovich, 1970	3496	DDT	Rat (*Rattus norvegicus*)	2	U	GV	4	mo	NR	NR	SM	F	REP	GREP	WO		0.020	86
133	Palanza et al., 1999	3533	DDT	Mouse (*Mus musculus*)	3	U	FD	7	d	NR	NR	GE	B	REP	PBEH	WO		0.020	83
134	Ledoux et al., 1977	3437	DDT	Mouse (*Mus musculus*)	4	U	FD	15	d	7	w	GE	B	REP	PRWT	WO		0.636	78
135	Tarjan and Kemeny, 1969	3621	DDT	Mouse (*Mus musculus*)	2	UX	FD	6	mo	NR	NR	GE	F	REP	PRWT	WO		0.70	88
136	Ware and Good, 1967	3649	DDT	Mouse (*Mus musculus*)	2	U	FD	120	d	NR	NR	GE	B	REP	FERT	WO		0.731	78
137	Rao et al., 1978	3564	DDT	Rat (*Rattus norvegicus*)	3	U	OR	8	w	NR	NR	JV	M	REP	TEWT	TE		1.0	81
138	Paulsen et al 1975	3538	DDT	Rat (*Rattus norvegicus*)	3	U	FD	14	d	90-100	d	GE	F	REP	RBEH	WO		2.0	80
139	Nickerson and Sniffen, 1973	3510	DDT	Rat (*Rattus norvegicus*)	2	U	FD	8	w	7	w	JV	F	REP	FERT	WO		2.0	83
140	Lindenau et al, 1994	3447	DDT	Rabbit (*Oryctolagus cuniculus*)	2	U	GV	12	w	NR	NR	SM	F	REP	OVRT	WO		3.0	79
141	Ledoux et al., 1977	3437	DDT	Mouse (*Mus musculus*)	4	U	FD	15	d	7	w	GE	B	REP	PROG	WO		3.82	78
142	Wilson et al., 1946	14719	DDT	Sheep (*Ovis aries*)	2	U	FD	175	d	NR	NR	GE	F	REP	PRWT	WO		4.22	80
143	Jonsson et al., 1976	3410	DDT	Rat (*Rattus norvegicus*)	3	U	FD	36	w	NR	NR	GE	F	REP	PROG	WO		6.60	79
144	Ottoboni et al 1977	3531	DDT	Dog (*Canis familiaris*)	4	U	OR	3	lf	NR	NR	GE	B	REP	FERT	WO		9.90	86
145	Fitzhugh and Nelson, 1947	14714	DDT	Rat (*Rattus norvegicus*)	5	U	FD	89	w	21	d	JV	F	REP	ABNM	OV		16.2	78
146	Craig and Ogilvie, 1974	3233	DDT	Mouse (*Mus musculus*)	2	U	FD	6	w	NR	NR	GE	F	REP	PROG	NR		25.3	78
147	Krause et al., 1975	3433	DDT	Rat (*Rattus norvegicus*)	2	U	GV	14	d	4	d	JV	M	REP	TEWT	TE		200	86
Growth (GRO)																			
148	Wrenn et al., 1970	3670	DDT	Rat (*Rattus norvegicus*)	2	U	GV	15	d	18	d	JV	B	GRO	BDWT	WO	0.694		80
149	Wrenn et al., 1970	3670	DDT	Rat (*Rattus norvegicus*)	3	U	GV	15	d	18	d	JV	F	GRO	BDWT	WO	0.735		80
150	Dinu et al 1974	3256	DDT	Rat (*Rattus norvegicus*)	2	U	FD	72	d	4	w	JV	M	GRO	BDWT	WO	1.27		78
151	Dinu et al 1974	3256	DDT	Rat (*Rattus norvegicus*)	2	U	FD	72	d	NR	NR	JV	F	GRO	BDWT	WO	1.42		78
152	Wilson et al., 1946	14719	DDT	Rat (*Rattus norvegicus*)	2	U	FD	6	w	NR	NR	JV	B	GRO	BDWT	WO	1.43	4.19	83
153	Dinu et al 1974	3256	DDT	Rat (*Rattus norvegicus*)	2	U	FD	72	d	NR	NR	JV	F	GRO	BDWT	WO	1.50		78
154	Banerjee et al., 1983	3171	DDT	Rat (*Rattus norvegicus*)	2	U	FD	1	yr	NR	NR	JV	M	GRO	BDWT	WO	1.77		77
155	Nickerson and Sniffen, 1973	3510	DDT	Rat (*Rattus norvegicus*)	2	U	FD	5	w	7	w	JV	F	GRO	BDWT	WO	2.00		72
156	Treon et al , 1953	14964	DDT	Rat (*Rattus norvegicus*)	4	U	FD	28	w	27	d	JV	B	GRO	BDWT	WO	2.04		68
157	Street and Sharma, 1975	3612	DDT	Rabbit (*Oryctolagus cuniculus*)	5	U	FD	57	d	NR	NR	AD	M	GRO	BDWT	WO	6.54		68
158	Kornbrust et al, 1986	3431	DDE	Rat (*Rattus norvegicus*)	2	U	GV	75	d	55	d	GE	F	GRO	BDWT	WO	7.07		84
159	Deichmann, 1974	947	DDT	Mouse (*Mus musculus*)	2	U	FD	260	d	4	w	GE	B	GRO	BDWT	WO	12.4		77
160	Bunyan and Page, 1973	3208	DDE	Rat (*Rattus norvegicus*)	2	U	FD	21	d	NR	NR	JV	M	GRO	BDWT	WO	13.5		77
161	Bunyan and Page, 1973	3208	DDMU	Rat (*Rattus norvegicus*)	2	U	FD	21	d	NR	NR	JV	M	GRO	BDWT	WO	13.5		77
162	Bunyan et al., 1972	3209	DDT	Rat (*Rattus norvegicus*)	2	U	FD	21	d	NR	NR	JV	M	GRO	BDWT	WO	13.6		77
163	Bunyan et al., 1972	3209	DDE	Rat (*Rattus norvegicus*)	4	U	FD	21	d	NR	NR	JV	M	GRO	BDWT	WO	13.7		77
164	Fitzhugh and Nelson, 1947	14714	DDT	Rat (*Rattus norvegicus*)	5	U	FD	12	w	21	d	JV	F	GRO	BDWT	WO	16.9	33.7	82
165	Foster, 1968	961	DDD	Rat (*Rattus norvegicus*)	3	U	FD	43	d	NR	NR	JV	M	GRO	BDWT	WO	17.5		77
166	Foster, 1968	961	DDT	Rat (*Rattus norvegicus*)	3	U	FD	42	d	NR	NR	JV	M	GRO	BDWT	WO	17.6		77
167	Banerjee and Pasha, 1996	3172	DDD	Rat (*Rattus norvegicus*)	2	U	FD	6	w	NR	NR	JV	M	GRO	BDWT	WO	19.4		77
168	Banerjee and Pasha, 1996	3172	DDT	Rat (*Rattus norvegicus*)	2	U	FD	6	w	NR	NR	JV	M	GRO	BDWT	WO	19.4		77
169	Banerjee and Pasha, 1996	3172	DDE	Rat (*Rattus norvegicus*)	2	U	FD	6	w	NR	NR	JV	M	GRO	BDWT	WO	19.5		77
170	Banerjee and Pasha, 1996	3172	DDA	Rat (*Rattus norvegicus*)	2	U	FD	6	w	NR	NR	JV	M	GRO	BDWT	WO	19.6		77
171	Treon et al, 1951	14960	DDT	Rat (*Rattus norvegicus*)	6	U	FD	20	w	NR	NR	JV	B	GRO	BDWT	WO	22.6		68
172	Kimbrough et al. 1971	1020	DDT	Rat (*Rattus norvegicus*)	3	U	FD	8	w	3-4	mo	JV	M	GRO	BDWT	WO	26.5		77
173	Rossi et al., 1983	3804	DDE	Golden hamster (*Mesocricetus auratuss*)	3	UX	FD	72	w	8	w	JV	B	GRO	BDWT	WO	48.3	96.5	88
174	Cannon and Holcomb, 1968	3214	DDT	Mouse (*Mus musculus*)	3	U	FD	55	d	4-5	mo	JV	M	GRO	BDWT	WO	60.7		69
175	Cecil et al., 1971	3349	DDT	Rat (*Rattus norvegicus*)	6	U	FD	7	d	22	d	JV	F	GRO	BDWT	WO	76.2		69
176	Hoffman et al., 1970	3380	DDT	Rat (*Rattus norvegicus*)	15	U	FD	14	d	NR	NR	JV	M	GRO	BDWT	WO	90.3	137	83
177	Platt and Cockrill, 1969	3555	DDT	Rat (*Rattus norvegicus*)	2	U	FD	14	d	NR	NR	JV	M	GRO	BDWT	WO	96.3		68
178	Rossi et al., 1983	3804	DDT	Golden hamster (*Mesocricetus auratuss*)	2	UX	FD	72	w	8	w	JV	B	GRO	BDWT	WO	98.8		73
179	Krause et al., 1975	3433	DDT	Rat (*Rattus norvegicus*)	2	U	GV	14	d	4	d	JV	M	GRO	BDWT	WO	200		75
180	Chowdhury et al., 1990	3224	DDT	Rat (*Rattus norvegicus*)	2	U	GV	120	d	NR	NR	JV	M	GRO	BDWT	WO		0.20	84
181	Wilson et al., 1946	14719	DDT	Sheep (*Ovis aries*)	2	U	FD	94	d	NR	NR	JV	NR	GRO	BDWT	WO		1.75	78
182	Ali and Shakoori, 1996	3163	DDT	Rat (*Rattus norvegicus*)	2	U	FD	18	mo	3	mo	JV	NR	GRO	BDWT	WO		7.5	81
183	Ali and Shakoori, 1996	3163	DDT	Rat (*Rattus norvegicus*)	2	U	FD	9	d	5	mo	JV	NR	GRO	BDWT	WO		15.0	81
184	Yagi et. al., 1979	3672	DDT	Rat (*Rattus norvegicus*)	2	U	FD	50	d	NR	NR	JV	M	GRO	BDWT	WO		47.3	77
185	Laug and Fitzhugh, 1946	14715	DDT	Rat (*Rattus norvegicus*)	3	U	FD	6	mo	21	d	JV	M	GRO	BDWT	WO		62.9	76
Survival (MOR)																			
186	Ware and Good, 1967	3649	DDT	Mouse (*Mus musculus*)	2	U	FD	120	d	6	w	GE	B	MOR	MORT	WO	0.863		68
187	Ware and Good, 1967	3649	DDT	Mouse (*Mus musculus*)	2	U	FD	120	d	NR	NR	GE	B	MOR	MORT	WO	0.989		77
188	Ortega et al, 1957	3527	DDT	Rat (*Rattus norvegicus*)	7	U	FD	6	mo	NR	NR	JV	B	MOR	MORT	WO	1.55	5.18	82

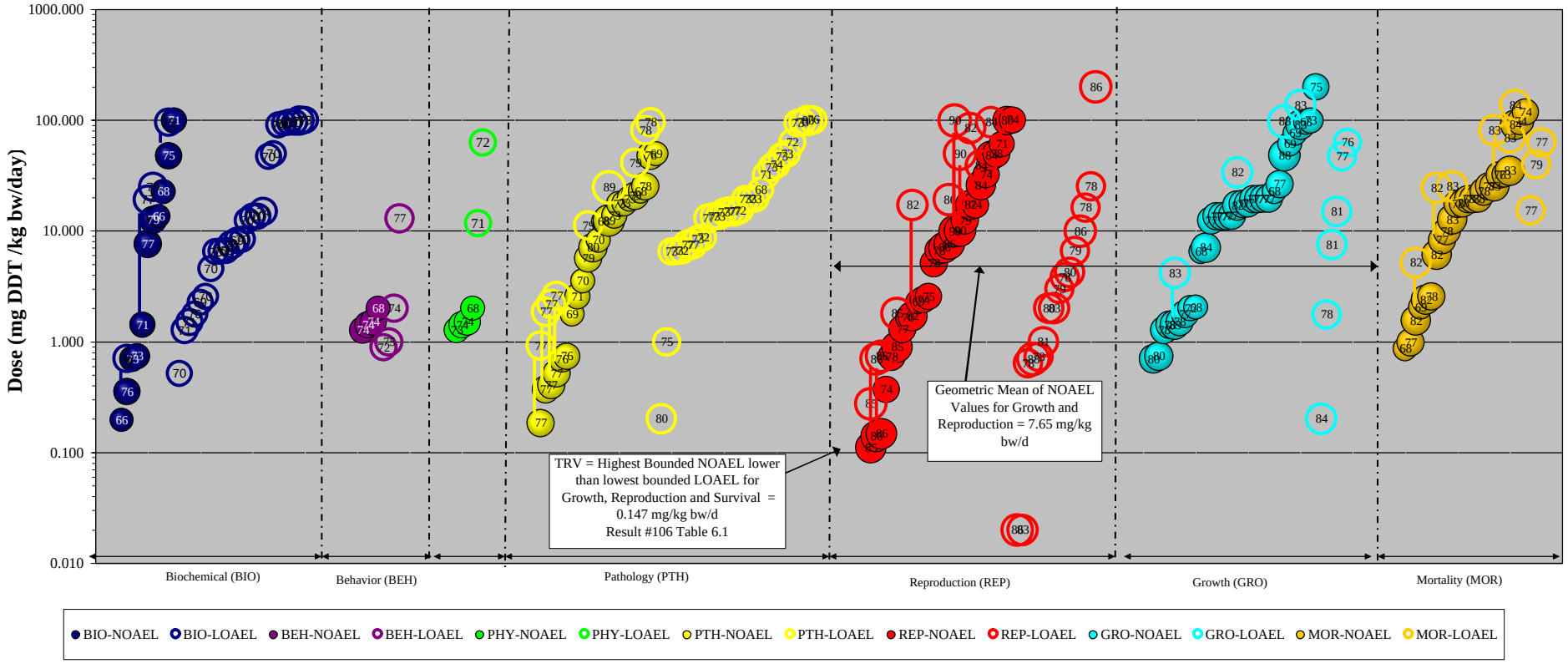
Table 6.1
Mammalian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
DDT and Metabolites (DDE, DDD, DDE, DDMU, DDA)

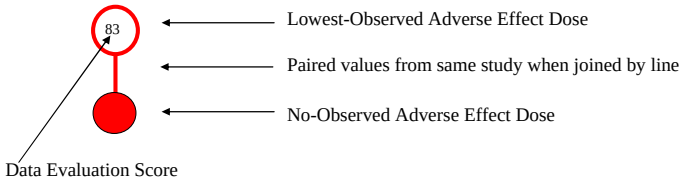
Result #	Reference	Ref No.	Form	Test Organism	# of Conc/ Doses	Method of Analyses	Route of Exposure	Exposure Duration	Duration Units	Age	Age Units	Lifestage	Sex	Effect Type	Effect Measure	Response Site	NOAEL Dose* (mg/kg bw/day)	LOAEL Dose* (mg/kg bw/day)	Total
189	Treon et al , 1953	14964	DDT	Rat (*Rattus norvegicus*)	4	U	FD	28	w	27	d	JV	B	MOR	MORT	WO	2.04		69
190	Wolfe et al., 1979	3666	DDT	Field mouse (*Peromyscus polionotus*)	3	U	FD	15	mo	60	d	JV	B	MOR	MORT	WO	2.40		82
191	Cecil et al, 1975	3221	DDT	Sheep (*Ovis aries*)	2	U	FD	17	w	1	yr	JV	F	MOR	MORT	WO	2.57		78
192	Treon et al, 1951	14960	DDT	Rat (*Rattus norvegicus*)	6	U	FD	27	w	NR	NR	JV	B	MOR	MORT	WO	6.10	24.39	82
193	Cecil et al, 1975	3221	DDT	Rat (*Rattus norvegicus*)	2	U	FD	20	w	60-90	d	JV	F	MOR	MORT	WO	8.22		77
194	Banerjee et al., 1995	3173	DDT	Rat (*Rattus norvegicus*)	4	U	FD	4	w	NR	NR	JV	M	MOR	MORT	WO	9.95		78
195	Bernard and Gaertner, 1964	3802	DDT	Mouse (*Mus musculus*)	5	U	FD	73	d	4	mo	JV	B	MOR	MORT	WO	12.7	25.4	83
196	Foster, 1968	961	DDD	Rat (*Rattus norvegicus*)	3	U	FD	42	d	NR	NR	JV	M	MOR	MORT	WO	17.5		78
197	Foster, 1968	961	DDT	Rat (*Rattus norvegicus*)	3	U	FD	42	d	NR	NR	JV	M	MOR	MORT	WO	17.6		78
198	Banerjee and Pasha, 1996	3172	DDD	Rat (*Rattus norvegicus*)	2	U	FD	6	w	NR	NR	JV	M	MOR	MORT	WO	19.4		78
199	Banerjee and Pasha, 1996	3172	DDT	Rat (*Rattus norvegicus*)	2	U	FD	6	w	NR	NR	JV	M	MOR	MORT	WO	19.4		78
200	Banerjee and Pasha, 1996	3172	DDE	Rat (*Rattus norvegicus*)	2	U	FD	6	w	NR	NR	JV	M	MOR	MORT	WO	19.5		78
201	Treon et al, 1951	14960	DDT	Rat (*Rattus norvegicus*)	6	U	FD	27	w	NR	NR	JV	B	MOR	MORT	WO	22.6		78
202	Craig and Ogilvie, 1974	3233	DDT	Mouse (*Mus musculus*)	2	U	FD	6	w	NR	NR	GE	F	MOR	MORT	WO	25.3		77
203	Clark and Stafford, 1981	73	DDE	Little brown bat (*Myotis lucifugus*)	3	M	FD	8	d	NR	NR	AD	F	MOR	MORT	WO	25.4	81.2	83
204	Clark and Kroll 1977	74	DDE	Free-tailed bat (*Tadarida brasiliensis*)	2	M	FD	40	d	NR	NR	AD	F	MOR	MORT	WO	31.9		76
205	Hayes, 1976	3865	DDT	Rat (*Rattus norvegicus*)	2	U	FD	116	d	21	d	GE	F	MOR	MORT	WO	32.2		73
206	Fitzhugh and Nelson, 1947	14714	DDT	Rat (*Rattus norvegicus*)	5	U	FD	12	mo	21	d	JV	M	MOR	MORT	WO	34.9	69.7	83
207	Hoffman et al., 1970	3380	DDT	Rat (*Rattus norvegicus*)	15	U	FD	14	d	NR	NR	JV	M	MOR	MORT	WO	90.3	137	84
208	Rossi et al., 1983	3804	DDE	Golden hamster (*Mesocricetus auratuss*)	3	UX	FD	52	w	8	w	JV	F	MOR	SURV	WO	96.5		74
209	Rossi et al., 1983	3804	DDT	Golden hamster (*Mesocricetus auratuss*)	2	UX	FD	120	w	8	w	JV	B	MOR	SURV	WO	119		74
210	Fitzhugh and Nelson, 1947	14714	DDT	Rat (*Rattus norvegicus*)	5	U	FD	12	mo	21	d	JV	F	MOR	MORT	WO		15.3	77
211	Cannon and Holcomb, 1968	3214	DDT	Mouse (*Mus musculus*)	3	U	FD	55	d	4-5	mo	JV	B	MOR	SURV	WO		39.8	79
212	Laug and Fitzhugh, 1946	14715	DDT	Rat (*Rattus norvegicus*)	3	U	FD	6	mo	21	d	JV	M	MOR	MORT	WO		62.9	77

ACHE = acetylcholinesterase; ACTP = accuracy of learned behavior; ACTV = activity, general; AD = adult; AR = adrenal; ASAT = aspartate aminotransferase; B = both; BDWT = body weight changes; BEH = behavior; BL = blood; BLPR = blood pressure; BR = brain; bw = body weight; CHM = chemical changes; CHOL = cholesterol; d - day; DOPA = dopamine; DR = Drinking water; ENZ = enyzme level changes; EXCR = excretion; F = female; FCNS = food consumption; FD = food; FDB = feeding behavior; GBCM = general biochemical changes; GE = gestation; GENZ = general enzyme changes; GHIS = general histology; GLPX = glutathione peroxidase; GPHY = general pysiology changes; GRO = growth; GRS = gross body weight changes; GV = gavage; HA = hair; HE = heart; HIS = histological changes;HMGL = hemoglobin; HRM = hormone changes; JV = juvenile; kg = kilograms; KI = kidney; L = liter; LI = liver; LOAEL = lowest observed adverse effect level; mo = months; M = male; M = measured; MOR = effects on mortality and survival; MORT = mortality; NOAEL = No Observed Advese Effect Level; NR = Not reported; OR = other oral; ORW = organ weight changes; ORWT = organ weight changes; PHY = physiology; PL = plasma; PORP = porphyrin; PROG = progeny numbers/counts; PRWT = progeny weight; PTH = pathology; RBCE = red blood cell count; REP = reproduction; RPRT = respiratory rate; RSEM = resorbed embryo; SM = sexually mature; SMIX = weight relative to body weight; SP = spleen; SR = serum; SURV = survival; TE = testes; TEWT = testes weight; TRII = tridothyronine; TRYP = tryptophan; U = unmeasured; UR = urine; USTR = ultrastructural changes; UX = measured but values not reported; w = weeks; WCON = water consumption; WO = whole organism; yr = year.

*NOAEL and LOAEL values that are equal and from the same reference represent different experimental designs.

Figure 6.1 Mammalian TRV Derivation for DDT and Metabolites





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 within the growth and reproduction effect groups for calculation of a geometric mean.
3) The geometric mean is equal to 7.65 mg DDT/kg bw/d and is higher than the lowest bounded LOAEL for results within the reproduction, growth, and survival (MOR) effect groups.
4) The mammalian wildlife TRV for DDT is equal to 0.147 mg DDT/kg bw/day which is the highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival.

Table 6.2 Calculation of the Mammalian Eco-SSL for DDT (and metabolites)						
Surrogate Receptor Group	**TRV for DDT (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 DDT in Biota Type (i)[2,3] (B_i) (mg/kg dw)**	**DDT in Diet of Prey [4] (C_{diet})**	**Eco-SSL (mg/kg dw)[5]**
Mammalian herbivore (vole)	0.147	0.0875	0.032	$\ln(B_i) = 0.7524 * \ln(Soil_j) - 2.5119$	NA	24
Mammalian ground insectivore (shrew)	0.147	0.209	0.030	$B_i = 11.2 * Soil_j$ where i = earthworms	NA	0.063
Mammalian carnivore (weasel)	0.147	0.130	0.043	$B_i = 4.83 * C_{diet}$ where i = mammals	$C_{diet} = 11.2 * Soil_j$	0.021

[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] C_{diet} = Concentration in the diet of small mammals consumed by predatory species (weasel).
[5] $HQ = FIR * (Soil_j * P_s + B_i) / TRV$ 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) - DDT and Metabolites

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Appendix 5.1 Avian Toxicity Data Extracted for Wildlife Toxiicty Reference Value (TRV)
DDT and Metabolites

Ref				Exposure																						Effects						Conversion to mg/kg bw/day				Result		Data Evaluation Score													
Result #	Ref No.	Reference		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	General Effect Group	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	990	Heinz et al., 1980	DDE	DDE	100	Ringed turtle dove (Streptopelia risoria)	4	0/2.08/20.0/170	mg/kg diet	N	na	ADL	M	FD	8	w	NR	NR	AD	B	V	Lab	BIO	HRM	DOPA	BR	2.08	20	N	0.149	Y	0.01058	0.148	1.420	10	10	10	10	6	1	8	10	6	4	78
2	3332	Greichus and Hannon 1973	DDT	DDT and metabolites	100	Double Crested Cormorants (*Phalacrocorax auritus*)	4	0/5/12.5/25	mg/kg diet	N	na	DLY	U	FD	9	w	NR	NR	JV	B	M	Lab	BIO	CHM	VTMA	LI	5.0	12.5	Y	2.2	N	0.09723893	0.221	0.552	10	10	5	10	6	1	10	10	10	4	76
3	3254	Dieter, 1975	DDE	DDE	100	Starling (*Sturnus vulgaris*)	4	0/5/25/100	mg/kg diet	N	na	ADL	U	FD	7	w	NR	NR	NR	M	V	Lab	BIO	ENZ	CEST	PI	5.0	25.0	N	0.0847	N	0.01166743	0.687	3.44	10	10	5	10	5	1	10	10	6	4	71
4	3209	Bunyan et al., 1972	DDE	p,p' - DDE	100	Japanese quail (*Coturnix japonica*)	4	0/10/50/100	mg/kg diet	N	na	ADL	U	FD	21	d	4	w	JV	F	C	Lab	BIO	CHM	MCPR	LI	50	100	Y	0.12	N	0.0146376	6.10	12.2	10	10	5	10	6	1	10	10	10	4	76
5	71	Chang and Stokstad, 1975	DDE	DDE	100	Japanese quail (*Coturnix japonica*)	3	0/50/200	mg/kg diet	N	na	DLY	U	FD	14	w	2	w	JV	F	C	Lab	BIO	ENZ	CAAH	EG	50.0	200	Y	0.11	N	0.01383151	6.29	25.1	10	10	5	10	6	1	8	10	10	4	74
6	71	Chang and Stokstad, 1975	DDT	DDT	100	Japanese quail (*Coturnix japonica*)	3	0/25/100	mg/kg diet	N	na	DLY	U	FD	14	w	2	w	JV	F	C	Lab	BIO	ENZ	CAAH	EG	100		Y	0.1416	N	0.01630291	11.5		10	10	5	10	6	1	4	10	10	4	70
7	3209	Bunyan et al., 1972	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	21	d	4	w	JV	F	C	Lab	BIO	CHM	MCPR	LI	100		Y	0.117	N	0.01439833	12.3		10	10	5	10	6	1	4	6	10	4	66
8	3218	Cecil et al., 1971	DDE	p,p' - DDE	100	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	74	d	39	d	SM	F	C	Lab	BIO	CHM	CALC	EG	100		N	0.1	N	0.0130	13.0		10	10	5	10	5	1	4	10	10	4	69
9	71	Chang and Stokstad, 1975	DDT	DDT	100	Japanese quail (*Coturnix japonica*)	3	0/50/200	mg/kg diet	N	na	DLY	U	FD	14	w	2	w	JV	F	C	Lab	BIO	ENZ	CAAH	EG	200		Y	0.181	N	0.0191281	21.1		10	10	5	10	6	1	4	10	10	4	70
10	71	Chang and Stokstad, 1975	DDE	DDE	100	Japanese quail (*Coturnix japonica*)	5	0/25/50/100/200	mg/kg diet	N	na	DLY	U	FD	14	w	2	w	JV	F	C	Lab	BIO	ENZ	CAAH	EG	200		Y	0.1345	N	0.01576599	23.4		10	10	5	10	6	1	4	8	10	4	68
11	3183	Biessmann and von Faber, 1981	DDT	DDT - Technical	100	Japanese quail (*Coturnix japonica*)	3	0/50/250	mg/kg diet	N	na	ADL	U	FD	9	w	5	w	JV	F	C	Lab	BIO	CHM	LIPD	AR	250		N	0.1	N	0.01299939	32.5		10	10	5	10	5	1	4	10	10	4	69
12	3183	Biessmann and von Faber, 1981	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/250	mg/kg diet	N	na	ADL	U	FD	5	w	5	w	JV	M	C	Lab	BIO	CHM	LIPD	AR	250		N	0.09	N	0.01213766	33.7		10	10	5	10	5	1	4	10	10	4	69
13	14916	Cooke, 1970	DDT	o,p' - DDT	100	Japanese quail (*Coturnix coturnix)*	2	0/37.6	mg/kg bw/d	N	na	X per w	U	GV	3	w	73	d	JV	M	V	Lab	BIO	CHM	CALC	SR	37.6		Y	0.114	N	0.0141569	37.6		10	8	5	10	10	1	4	8	10	4	70
14	3183	Biessmann and von Faber, 1981	DDE	p,p' - DDE	100	Japanese quail (*Coturnix japonica*)	2	0/300	mg/kg diet	N	na	ADL	U	FD	5	w	5	w	JV	F	C	Lab	BIO	CHM	LIPD	AR	300		N	0.1	N	0.01299939	39.0		10	10	5	10	5	1	4	10	10	4	69
15	77	Dieter 1974	DDE	DDE	100	Quail (*Coturnix japonica*)	4	0/5/25/100	mg/kg diet	N	na	DLY	U	FD	12	w	2	mo	SM	M	V	Lab	BIO	ENZ	CRKI	NR		5.0	N	0.09	N	0.01213766		0.674	10	10	5	10	5	1	4	10	10	4	69
16	14926	Peakall, 1970	DDT	p,p' - DDT	100	Ringed turtle dove (*Streptopelia risoria*)	2	0/10	mg/kg diet	N	na	NR	U	FD	29	d	NR	NR	SM	B	C	Lab	BIO	ENZ	GENZ	LI		10.0	N	0.146	N	0.01663094		1.14	10	10	5	10	5	1	4	10	10	4	69
17	3662	Wiemeyer et al, 1986	DDE	p,p' - DDE	100	American kestrel (*Falco sparverius*)	2	0/10	mg/kg diet	N	na	NR	U	FD	1	yr	NR	NR	AD	M	V	NR	BIO	CHM	LIPD	LI		10.0	Y	0.101	N	0.01308387		1.30	10	10	5	10	6	1	4	10	10	4	70
18	3462	Lundholm, 1985	DDE	p,p' - DDE	100	Duck (*Anas platyrhynchos*)	2	0/40	mg/kg diet	N	na	ADL	U	FD	45	d	1	yr	AD	F	C	FieldA	BIO	CHM	CALC	RT		40.0	N	1.1	N	0.06192552		2.25	10	10	5	10	5	1	4	10	10	4	69
19	3462	Lundholm, 1985	DDE	p,p' - DDE	100	Duck (*Anas platyrhynchos*)	2	0/40	mg/kg diet	N	na	ADL	U	FD	45	d	1	yr	AD	F	C	FieldA	BIO	CHM	CALC	EG		40.0	N	1.1	N	0.06192552		2.25	10	10	5	10	5	1	4	10	10	4	69
20	1106	Sell et al, 1971	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	3	0/100/200	mg/kg diet	N	na	DLY	U	FD	12	w	30	w	JV	F	C	Lab	BIO	ENZ	AHDX	LI		100	N	1.6	Y	0.090		5.63	10	10	5	10	6	1	4	10	10	4	70
21	3208	Bunyan and Page, 1973	DDMU	p,p' - DDMU	100	Japanese quail (*Coturnix japonica*)	4	0/50/150/250	mg/kg diet	N	na	ADL	U	FD	21	d	4	w	JV	F	C	Lab	BIO	ENZ	AHDX	LI		50.0	N	0.117	N	0.01439833		6.15	10	10	5	10	5	1	4	10	10	4	69
22	3656	Westlake et al., 1979	DDMU	DDMU	100	Japanese quail (*Coturnix japonica*)	4	0/50/100/150	mg/kg diet	N	na	ADL	U	FD	32	d	28	d	JV	F	C	Lab	BIO	ENZ	GOTR	PL		50.0	Y	0.1	N	0.01299939		6.50	10	10	5	10	6	1	4	10	10	4	70
23	3601	Stanley et al., 1978	DDMU	DDMU	100	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	31	d	4	w	JV	F	C	Lab	BIO	ENZ	G6PD	LI		100	N	0.125	N	0.01503181		12.0	10	10	5	10	5	1	4	10	10	4	69
24	3601	Stanley et al., 1978	DDT	o,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	31	d	4	w	JV	F	C	Lab	BIO	ENZ	G6PD	LI		100	N	0.125	N	0.01503181		12.0	10	10	5	10	5	1	4	10	10	4	69
25	3601	Stanley et al., 1978	DDE	p,p' - DDE	100	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	31	d	4	w	JV	F	C	Lab	BIO	ENZ	G6PD	LI		100	N	0.125	N	0.01503181		12.0	10	10	5	10	5	1	4	10	10	4	69
26	3601	Stanley et al., 1978	DDD	p,p' - DDD	100	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	31	d	4	w	NR	F	C	Lab	BIO	ENZ	G6PD	LI		100	N	0.125	N	0.01503181		12.0	10	10	5	10	5	1	4	10	10	4	69
27	3187	Cecil et al., 1973	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	2	mo	39	d	JV	F	C	Lab	BIO	CHM	VTMA	LI		100	Y	0.116	N	0.01431809		12.3	10	10	5	10	6	1	4	10	10	4	70
28	3218	Cecil et al., 1971	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	74	d	39	d	SM	F	C	Lab	BIO	CHM	CALC	EG		100	N	0.1	N	0.0130		13.0	10	10	5	10	5	1	4	10	10	4	69
29	3591	Sifri et al., 1975	DDT	p,p' - DDT	100	Mallard duck (*Anas platyrhynchos*)	2	0/100	ug/g diet	N	na	ADL	U	FD	14	d	8	d	JV	B	C	Lab	BIO	CHM	MCPR	LI		100	N	0.092	N	0.012312		13.4	10	10	5	10	5	1	4	10	10	4	69
30	975	Gillett and Arscott, 1969	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	23	w	4	w	JV	M	V	Lab	BIO	ENZ	AEPX	LI		100	N	0.09	N	0.012137		13.5	10	10	5	10	5	1	4	10	10	4	69
31	3591	Sifri et al., 1975	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	2	0/100	ug/g diet	N	na	ADL	U	FD	14	d	8	d	JV	B	C	Lab	BIO	CHM	MCPR	LI		100	N	0.084	N	0.0116		13.8	10	10	5	10	5	1	4	10	10	4	69
32	3203	Britton, 1975	DDT	DDT - Technical	100	Chicken (*Gallus domesticus*)	4	0/300/600/1200	mg/kg diet	N	na	DLY	U	FD	21	d	8	mo	JV	F	C	Lab	BIO	HRM	ESDL	LI		300	N	1.6	N	0.07903238		14.8	10	10	5	10	5	1	4	10	10	4	69
33	3208	Bunyan and Page, 1973	DDE	p,p' - DDE	100	Japanese quail (*Coturnix japonica*)	2	0/150	mg/kg diet	N	na	ADL	U	FD	21	d	4	w	JV	F	C	Lab	BIO	ENZ	P450	LI		150	Y	0.126	N	0.01510999		18.0	10	10	5	10	6	1	4	10	10	4	70
34	3583	Sell et al., 1972	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/200	mg/kg diet	N	na	ADL	U	FD	4	w	0	d	JV	F	C	Lab	BIO	ENZ	AHDX	LI		200	N	0.100	N	0.01300		26.0	10	10	5	10	5	1	4	10	10	4	69
35	3583	Sell et al., 1972	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/200	mg/kg diet	N	na	ADL	U	FD	22	d	0	d	JV	B	C	Lab	BIO	ENZ	AHDX	LI		200	Y	0.0769	N	0.0109562		28.5	10	10	5	10	6	1	4	10	10	4	70
36	3203	Britton, 1975	DDT	DDT - Technical	100	Chicken (*Gallus domesticus*)	2	0/500	mg/kg diet	N	na	DLY	U	FD	18	d	8	mo	JV	F	C	Lab	BIO	HRM	ESDL	LI		500	N	1.6	N	0.10109819		31.6	10	10	5	10	5	1	4	10	10	4	69
37	3592	Silver and Alpern, 1979	DDT	DDT - Technical	99	Chicken (*Gallus domesticus*)	2	0/400	mg/kg diet	N	na	ADL	U	FD	3	w	8	d	JV	NR	C	Lab	BIO	CHM	CALC	PL		400	Y	0.173	N	0.01857338		42.5	10	10	5	10	6	1	4	10	10	4	70
38	3563	Ragland et al., 1971	DDT	p,p' - DDT	100	Duck (*Anas platyrhynchos*)	2	0/900	mg/kg diet	N	na	ADL	U	FD	8	d	NR	NR	JV	M	C	Lab	BIO	ENZ	GENZ	LI		900	N	0.46	N	0.03628638		71.0	10	10	5	10	5	1	4	10	10	4	69
39	11434	Greichus et al, 1975	DDT	DDT - Mixture	100	White pelican (*Pelecanus erythrorhynchos*)	2	0/72	mg/kg diet	N	na	DLY	U	FD	10	w	NR	NR	JV	B	V	NR	BIO	CHM	PRTL	BL		72	Y	4.81	Y	0.695		72.0	10	10	5	10	10	1	4	10	10	4	74
Behavior																																																	
40	990	Heinz et al., 1980	DDE	DDE	100	Ringed turtle dove (Streptopelia risoria)	4	0/2.08/20.0/170	mg/kg diet	N	na	ADL	M	FD	8	w	NR	NR	AD	B	V	Lab	BEH	FDB	FCNS	WO	2.08	20	N	0.149	Y	0.01058	0.148	1.420	10	10	10	10	6	4	8	10	6	4	78
41	942	Davison and Sell, 1974	DDT	DDT - Technical	90	Duck (*Anas platyrhynchos*)	4	0/2/20/200	mg/kg diet	N	na	ADL	U	FD	343	d	2	yr	AD	F	V	Lab	BEH	FDB	FCNS	WO	20.0	200	Y	1.48	Y	0.062	0.754	7.54	10	10	5	10	7	4	8	6	6	4	70
42	14896	Mahoney 1975	DDE	p,p' - DDE	100	White Throated Sparrow (*Zonotrichia albicollis*)	3	0/5/25	mg/kg diet	N	na	ADL	U	FD	4	d	NR	NR	NR	M	Lab	BEH	BEH	NMVM	WO	5.0	25.0	N	0.0259	N	0.00539487	1.04	5.21	10	10	5	10	5	4	8	10	6	4	72
43	71	Chang and Stokstad, 1975	DDE	DDE	100	Japanese quail (*Coturnix japonica*)	3	0/50/200	mg/kg diet	N	na	DLY	U	FD	14	w	2	w	JV	F	C	Lab	BEH	BEH	EQUL	WO	50.0	200	Y	0.11	N	0.01383151	6.29	25.1	10	10	5	10	6	4	8	10	10	4	77
44	3801	Azevedo et al., 1965	DDT	DDT - Technical	88.5	Pheasant (*Phasianus colchicus*)	4	0/0.464/5.10/6.86	mg/kg bw/d	N	na	ADL	UX	FD	105	d	NR	NR	AD	B	C	FieldA	BEH	FDB	FCNS	WO		0.464	N	1.3	N	0.0690399		0.411	10	10	10	10	10	4	4	10	6	4	73
45	14896	Mahoney 1975	DDT	DDT - Technical	100	White Throated Sparrow (*Zonotrichia albicollis*)	3	0/5/25	mg/kg diet	N	na	ADL	U	FD	6	w	NR	NR	NR	NR	M	Lab	BEH	BEH	NMVM	WO		5.0	N	0.0259	N	0.00539487		1.04	10	10	5	10	5	4	4	10	6	4	68
46	3591	Sifri et al., 1975	DDT	p,p' - DDT	100	Mallard duck (*Anas platyrhynchos*)	2	0/100	ug/g diet	N	na	ADL	U	FD	14	d	8	d	JV	B	C	Lab	BEH	BEH	INST	WO		100	N	0.092	N	0.01231		13.4	10	10	5	10	5	4	4	10	10	4	72
47	3591	Sifri et al., 1975	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	2	0/100	ug/g diet	N	na	ADL	U	FD	14	d	8	d	JV	B	C	Lab	BEH	BEH	INST	WO		100	N	0.084	N	0.0116		13.8	10	10	5	10	5	4	4	10	10	4	72
Physiology																																																
48	14921	Jefferies and French 1971	DDT	p,p' - DDT	100	Homing Pigeon (*Columba livia*)	3	0/3/36	mg/kg/d	N	na	DLY	U	OR	19	w	NR	NR	AD	B	V	Lab	PHY	PHY	BTMP	WO	3.0	36.0	Y	0.415	N	0.03283011	0.237	2.85	10	8	5	10	6	4	6	10	6	4	69
49	14922	Jefferies et al, 1971	DDT	p,p' - DDT	100	Bengalese finch (*Lonchura striata*)	2	0/3.8/7.5/8.7/11.7	mg/kg bw/d	N	na	DLY	U	FD	6	w	NR	NR	NR	B	V	Lab	PHY	PHY	HTRT	WO	3.80	7.50	Y	0.01381	N	0.00358252	3.80	7.50	10	10	10	10	10	4	10	10	6	4	84
50	14922	Jefferies et al, 1971	DDT	p,p' - DDT	100	Homing Pigeon (*Columba livia*)	6	0/3/6/9/18/36	mg/kg bw/d	N	na	DLY	U	OR	3	w	NR	NR	AD	B	V	Lab	PHY	PHY	HTRT	WO		3.0	Y	0.417	N	0.03293302		3.0	10	8	10	10	10	4	4	10	6	4	76
Pathology																																																
51	990	Heinz et al., 1980	DDE	DDE	100	Ringed turtle dove (*Streptopelia risoria*)	4	0/2.08/20.0/170	mg/kg diet	N	na	ADL	M	FD	8	w	NR	NR	AD	B	V	Lab	PTH	ORW	ORWT	LI	2.08	20	N	0.149	Y	0.01058	0.148	1.420	10	10	10	10	6	4	8	10	6	4	78
52	3332	Greichus and Hannon 1973	DDT	DDT and metabolites	100	Double Crested Cormorants (*Phalacrocorax auritus*)	4	0/5/12.5/25	mg/kg diet	N	na	DLY	U	FD	9	w	NR	NR	JV	B	M	Lab	PTH	ORW	SMIX	LI	12.5	25.0	Y	2.2	N	0.09723893	0.552	1.10	10	10	5	10	6	4	10	10	10	4	79
53	3766	Chura and Stewart 1967	DDT	p,p' - DDT - Technical	100	Bald eagle (*Haliaeetus leucocephalus*)	2	0/10	mg/kg diet	N	na	DLY	U	FD	120	d	NR	NR	JV	B	V	Lab	PTH	ITX	GITX	WO	10.0		Y	5.625	Y	0.324	0.576		10	10	5	10	7	4	4	10	10	4	74
54	77	Dieter 1974	DDE	DDE	100	Quail (*Coturnix japonica*)	4	0/5/25/100	mg/kg diet	N	na	DLY	U	FD	12	w	2	mo	SM	M	V	Lab	PTH	ORW	SMIX	LI	5.0	25.0	N	0.09	N	0.01213766	0.674	3.37	10	10	5	10	5	4	8	10	10	4	76
55	3766	Chura and Stewart 1967	DDT	p,p' - DDT - Technical	100	Bald eagle (*Haliaeetus leucocephalus*)	5	0/10/160/800/4000	mg/kg diet	N	na	DLY	U	FD	55	d	NR	NR	JV	B	V	Lab	PTH	ITX	GITX	WO	10.0	160	Y	5.625	Y	0.401	0.713	11.4	10	10	5	10	7	4	6	10	10	4	76

Appendix 5.1 Avian Toxicity Data Extracted for Wildlife Toxiicty Reference Value (TRV)
DDT and Metabolites
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Ref				Exposure																				Effects						Conversion to mg/kg bw/day				Result		Data Evaluation Score												
Result #	Ref No.	Reference		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	General Effect Group	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
56	3220	Cecil et al., 1978	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	4	0/5/50/500	mg/kg diet	N	na	ADL	U	FD	30	d	11	mo	SM	M	C	Lab	PTH	ORW	ORWT	LI	50.0	500	Y	1.98	N	0.09079293	2.29	22.9	10	10	5	10	6	4	8	10	6	4	73
57	3388	Hurst et al., 1974	DDT	DDT - Technical	100	Bobwhite quail (*Colinus virginianus*)	4	0/5/50/500	mg/kg diet	N	na	ADL	U	FD	2	mo	NR	NR	SM	B	V	FieldA	PTH	ORW	ORWT	LI	50.0	500	Y	0.194	N	0.020116	5.16	51.6	10	10	5	10	6	4	8	10	10	4	77
58	1106	Sell et al, 1971	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	3	0/100/200	mg/kg diet	N	na	DLY	U	FD	12	w	30	w	JV	F	C	Lab	PTH	ORW	ORWT	LI	200		N	1.6	Y	0.090	11.3		10	10	5	10	6	4	4	10	10	4	73
59	3601	Stanley et al., 1978	DDT	o,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	31	d	4	w	JV	F	C	Lab	PTH	ORW	SMIX	LI	100		N	0.125	N	0.01503181	12.0		10	10	5	10	5	4	4	6	10	4	68
60	3601	Stanley et al., 1978	DDE	p,p' - DDE	100	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	31	d	4	w	JV	F	C	Lab	PTH	ORW	SMIX	LI	100		N	0.125	N	0.01503181	12.0		10	10	5	10	5	4	4	8	10	4	70
61	3601	Stanley et al., 1978	DDD	p,p' - DDD	100	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	31	d	4	w	JV	F	C	Lab	PTH	ORW	SMIX	LI	100		N	0.125	N	0.01503181	12.0		10	10	5	10	5	4	4	6	10	4	68
62	3209	Bunyan et al., 1972	DDE	p,p' - DDE	100	Japanese quail (*Coturnix japonica*)	4	0/10/50/100	mg/kg diet	N	na	ADL	U	FD	21	d	4	w	JV	F	C	Lab	PTH	ORW	ORWT	LI	100		Y	0.12	N	0.0146376	12.2		10	10	5	10	6	4	4	10	10	4	73
63	3209	Bunyan et al., 1972	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	21	d	4	w	JV	F	C	Lab	PTH	ORW	ORWT	LI	100		Y	0.117	N	0.01439833	12.3		10	10	5	10	6	4	4	10	10	4	73
64	3187	Cecil et al., 1973	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	2	mo	39	d	JV	F	C	Lab	PTH	ORW	ORWT	LI	100		Y	0.116	N	0.01431809	12.3		10	10	5	10	6	4	4	10	10	4	73
65	975	Gillett and Arscott, 1969	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	23	w	4	w	JV	M	V	Lab	PTH	ORW	ORWT	LI	100		N	0.09	N	0.012137	13.5		10	10	5	10	5	4	4	8	10	4	70
66	3208	Bunyan and Page, 1973	DDE	p,p' - DDE	100	Japanese quail (*Coturnix japonica*)	2	0/150	mg/kg diet	N	na	ADL	U	FD	21	d	4	w	JV	F	C	Lab	PTH	ORW	SMIX	LI	150		Y	0.126	N	0.01510999	18.0		10	10	5	10	6	4	4	8	10	4	71
67	3377	Hill et al., 1971	DDT	DDT - Technical	100	Bobwhite quail (*Colinus virginianus*)	8	0/25/50/100/200/400/800/1600	mg/kg diet	N	na	ADL	U	FD	5	d	NR	NR	AD	M	C	Lab	PTH	GRS	BDWT	WO	200	400	Y	0.205	N	0.02074315	20.2	40.5	10	10	5	10	6	4	10	10	6	4	75
68	3204	Britton, 1975	DDT	DDT - Technical	98	Chicken (*Gallus domesticus*)	4	0/300/600/1200	mg/kg diet	N	na	DLY	U	FD	9	w	19	mo	AD	F	C	Lab	PTH	ITX	GITX	WO	600	1200	N	1.6	N	0.07903238	29.0	58.1	10	10	5	10	5	4	10	10	6	4	74
69	14916	Cooke, 1970	DDT	o,p' - DDT	100	Japanese quail (*Coturnix coturnix)*	2	0/37.6	mg/kg bw/d	N	na	X per w	U	GV	3	w	73	d	JV	M	V	Lab	PTH	ORW	ORWT	LI	37.6		Y	0.114	N	0.0141569	37.6		10	8	5	10	10	4	4	10	10	4	75
70	14921	Jefferies and French 1971	DDT	p,p' - DDT	100	Homing Pigeon (*Columba livia*)	6	0/3/6/9/18/36	mg/kg/d	N	na	DLY	U	OR	56	d	NR	NR	AD	B	V	Lab	PTH	ORW	ORWT	TY		3.0	Y	0.415	N	0.03283011		0.237	10	8	5	10	6	4	4	10	6	4	67
71	3315	Ghosh et al., 1997	DDD	o,p' - DDD	100	Pigeon (*Coumba livia*)	2	0/0.1	mg/org/d	N	na	DLY	U	OR	4	d	NR	NR	AD	B	C	Lab	PTH	HIS	GHIS	TY		0.100	Y	0.25	N	0.0236038		0.40	10	8	10	10	6	4	4	10	3	4	69
72	3662	Wiemeyer et al, 1986	DDE	p,p' - DDE	100	American kestrel (*Falco sparverius*)	2	0/10	mg/kg diet	N	na	NR	U	FD	1	yr	NR	NR	AD	M	V	NR	PTH	GRS	BDWT	WO		10.0	Y	0.101	N	0.01308387		1.30	10	10	5	10	6	4	4	10	10	4	73
73	3438	Lehman et al., 1974	DDT	DDT - Technical	100	Bobwhite quail (*Colinus virginianus*)	4	0/10/50/150	mg/kg diet	N	na	ADL	U	FD	242	d	28	d	JV	B	C	FieldA	PTH	ORW	ORWT	BR		10	N	0.04	N	0.00715919		1.79	10	10	5	10	5	4	4	10	10	4	72
74	3440	Lillie et al., 1973	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	2	0/50	mg/kg diet	N	na	ADL	U	FD	28	w	72	w	SM	F	V	Lab	PTH	GRS	BDWT	WO		50.0	Y	2.153	Y	0.118		2.74	10	10	5	10	7	8	4	10	10	4	78
75	3430	Kolaja and Hinton, 1978	DDT	DDT	100	Mallard duck (*Anas platyrhynchos*)	2	0/50	mg/kg diet	N	na	ADL	U	FD	6	mo	NR	NR	LB	F	C	Lab	PTH	HIS	GHIS	SG		5.0	N	1.1	N	0.06192552		2.81	10	10	5	10	5	4	4	10	10	4	72
76	14922	Jefferies et al, 1971	DDT	p,p' - DDT	100	Homing Pigeon (*Columba livia*)	7	0/3/6/9/18/36/54	mg/kg bw/d	N	na	DLY	U	OR	8	w	NR	NR	AD	B	V	Lab	PTH	ORW	ORWT	HE		3.0	Y	0.418	N	0.03298441		3.0	10	8	10	10	10	4	4	10	6	4	76
77	3378	Kolaja and Hinton, 1976	DDT	DDT	100	Mallard duck (*Anas platyrhynchos*)	2	0/75	mg/kg diet	N	na	ADL	U	FD	7	w	NR	NR	NR	F	C	Lab	PTH	HIS	EDMA	RT		75.0	Y	1.1	N	0.06192552		4.22	10	10	5	10	5	4	4	10	10	4	72
78	14919	Genelly and Rudd, 1955	DDT	DDT	100	Ring-necked pheasant (*Phasianus colchicus*)	3	0/5.72/20.84	mg/org/d	N	na	NR	U	FD	74	d	6	mo	JV	B	C	Lab	PTH	HIS	GHIS	LI		5.72	N	0.95	Y	5.72E-05		6.02	10	10	5	10	6	4	4	10	10	4	73
79	3208	Bunyan and Page, 1973	DDMU	p,p' - DDMU	100	Japanese quail (*Coturnix japonica*)	4	0/50/150/250	mg/kg diet	N	na	ADL	U	FD	21	d	4	w	JV	F	C	Lab	PTH	ORW	SMIX	LI		50	Y	0.117	N	0.01439833		6.15	10	10	5	10	6	4	4	10	10	4	73
80	3400	Jefferies and French, 1969	DDT	p,p' - DDT	100	Homing Pigeon (*Columba livia*)	4	0/9.1/18.2/36.1	mg/kg bw/d	N	na	DLY	U	OR	42	d	NR	NR	AD	B	V	Lab	PTH	ORW	ORWT	BR		9.1	Y	0.3966	N	0.031875		9.10	10	8	10	10	10	4	4	10	10	4	80
81	3601	Stanley et al., 1978	DDMU	DDMU	100	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	31	d	4	w	JV	F	C	Lab	PTH	ORW	SMIX	LI		100	N	0.125	N	0.01503181		12.0	10	10	5	10	5	4	4	10	10	4	72
82	3591	Sifri et al., 1975	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/100	ug/g diet	N	na	ADL	U	FD	14	d	8	d	JV	B	C	Lab	PTH	ORW	SMIX	LI		100	N	0.100	N	0.02999		13.0	10	10	5	10	5	4	4	10	10	4	72
83	3183	Biessmann and von Faber, 1981	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/250	mg/kg diet	N	na	ADL	U	FD	5	w	5	w	JV	M	C	Lab	PTH	HIS	CTYP	AR		250	N	0.09	N	0.01213766		33.7	10	10	5	10	5	4	4	10	10	4	72
84	3183	Biessmann and von Faber, 1981	DDE	p,p' - DDE	100	Japanese quail (*Coturnix japonica*)	2	0/300	mg/kg diet	N	na	ADL	U	FD	5	w	5	w	JV	F	C	Lab	PTH	ORW	SMIX	AR		300	N	0.1	N	0.01299939		39.0	10	10	5	10	5	4	4	10	10	4	72
85	3592	Silver and Alpern, 1979	DDT	DDT - Technical	99	Chicken (*Gallus domesticus*)	2	0/400	mg/kg diet	N	na	ADL	U	FD	3	w	8	d	JV	NR	C	Lab	PTH	ORW	SMIX	LI		400	Y	0.173	N	0.01857338		42.5	10	10	5	10	6	4	4	10	10	4	73
86	11434	Greichus et al, 1975	DDT	DDT - Mixture	100	White pelican (*Pelecanus erythrorhynchos*)	2	0/72	mg/kg diet	N	na	DLY	U	FD	10	w	NR	NR	JV	B	V	NR	PTH	ORW	SMIX	LI		72.0	Y	4.81	Y	0.695		72.0	10	10	5	10	10	4	4	10	10	4	77
87	3622	Tarrant et al., 1983	DDMU	DDMU	100	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	UX	FD	7	d	28	d	JV	F	C	Lab	PTH	ORW	SMIX	LI		100	Y	0.00010	N	0.00014485		145	10	10	10	10	6	4	4	10	10	4	78
Reproduction																																																
88	3443	Lincer, 1975	DDE	DDE	100	American kestrel (*Falco sparverius*)	5	0/0.3/3/6/10	mg/kg diet	Y	N	DLY	U	FD	6	mo	NR	NR	LB	F	V	Lab	REP	EGG	ESTH	EG	0.300	3.0	Y	0.111	N	0.01391324	0.0396	0.396	10	10	5	10	6	10	8	10	10	4	83
89	3215	Carlisle et al., 1986	DDE	DDE	100	Mallard duck (*Anas platyrhynchos*)	4	0/1/5/20	mg/kg diet	N	na	ADL	U	FD	22	w	NR	NR	LB	F	C	Lab	REP	EGG	ESTH	EG	1.0	5.0	N	1.1	N	0.06192552	0.0563	0.281	10	10	5	10	5	8	10	10	10	4	82
90	942	Davison and Sell, 1974	DDT	DDT - Technical	90	Duck (*Anas platyrhynchos*)	4	0/2/20/200	mg/kg diet	N	na	ADL	U	FD	343	d	2	yr	LB	F	V	Lab	REP	EGG	ESWT	EG	2.0	20.0	Y	1.48	Y	0.062	0.0754	0.754	10	10	5	10	7	10	8	10	10	4	84
91	942	Davison and Sell, 1974	DDT	p,p' - DDT	99	Duck (*Anas platyrhynchos*)	5	0/2/20/40/200	mg/kg diet	N	na	ADL	U	FD	3	mo	1	yr	LB	F	V	Lab	REP	EGG	ESTH	EG	2.0	20.0	Y	1.05	N	0.05551437	0.113	1.13	10	10	5	10	6	10	8	10	10	4	83
92	942	Davison and Sell, 1974	DDT	p,p' - DDT	99	Duck (*Anas platyrhynchos*)	4	0/2/20/200	mg/kg diet	N	na	ADL	U	FD	343	d	2	yr	LB	F	V	Lab	REP	EGG	ESTH	EG	2.0	20.0	Y	1.32	Y	0.131	0.197	1.965	10	10	5	10	7	10	8	10	10	4	84
93	3805	Smith, et.al. 1969	DDT	DDT	100	Chicken (*Gallus domesticus*)	5	0/1.0/2.5/5.0/7.5/10.0	mg/kg diet	N	na	ADL	U	FD	2	mo	NR	NR	LB	F	C	Lab	REP	EGG	ESTH	EG	7.50	10	N	1.6	N	0.07903238	0.370	0.494	10	10	5	10	5	10	10	10	10	4	84
94	3722	Heath et al, 1969	DDT	p,p' - DDT	100	Mallard duck (*Anas platyrhynchos*)	4	0/2.5/10/40	mg/kg diet	N	na	ADL	U	FD	1	yr	NR	NR	LB	F	C	Lab	REP	REP	RSUC	WO	10.0	40	N	1.1	N	0.06192552	0.563	1.892	10	10	5	10	5	10	10	10	10	4	84
95	3638	Vangilder and Peterle, 1981	DDE	DDE	100	Mallard duck (*Anas platyrhynchos*)	2	0/10	mg/kg diet	N	na	ADL	U	FD	66	d	NR	NR	LB	F	C	Lab	REP	EGG	EGWT	EG	10.0		N	1.1	N	0.06192552	0.563		10	10	5	10	5	10	4	10	10	4	78
96	3356	Haseltine et al., 1974	DDE	p,p' - DDE	99.9	Pheasant (*Phasianus colchicus*)	2	0/10	mg/kg diet	N	na	ADL	U	FD	11	w	NR	NR	LB	F	V	Lab	REP	EGG	ESTH	EG	10.0		N	0.95	N	0.05628868	0.592		10	10	5	10	5	10	4	10	10	4	78
97	3239	Davison et al 1976	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	4	0/2.5/10/40	mg/kg diet	N	na	ADL	U	FD	16	w	9	w	LB	F	V	Lab	REP	REP	TPRD	WO	10.0	40.0	N	0.1	N	0.01299939	1.30	5.20	10	10	5	10	5	10	8	10	10	4	82
98	3440	Lillie et al., 1973	DDT	DDT - Technical	71	Chicken (*Gallus domesticus*)	3	0/10/50	mg/kg diet	N	na	ADL	U	FD	40	w	26	w	LB	F	C	Lab	REP	REP	FERT	WO	50.0		Y	2.204	Y	0.120	1.93		10	10	5	10	7	10	4	1	10	4	71
99	14929	Stephen et al, 1971	Mixture	DDT and DDE Mixture	98	Chicken (*Gallus domesticus*)	2	0/40	mg/kg diet	N	na	DLY	U	FD	18	d	18	mo	LB	F	V	Lab	REP	EGG	ESQU	EG	40.0		N	1.6	N	0.07903238	1.94		10	10	5	10	5	10	4	1	10	4	69
100	3216	Carnio and McQueen, 1973	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/15	mg/kg diet	N	na	ADL	U	FD	50	d	60	d	LB	B	V	Lab	REP	REP	FERT	WO	15.0		N	0.1	N	0.01299939	1.95		10	10	5	10	5	10	4	1	10	4	69
101	3459	Lundholm, 1990	DDE	p,p' - DDE	100	Chicken (*Gallus domesticus*)	2	0/40	mg/kg diet	N	na	ADL	U	FD	45	d	1	yr	LB	F	C	Lab	REP	EGG	ESWT	EG	40.0		N	1.6	N	0.079032	1.98		10	10	5	10	5	10	4	10	10	4	78
102	3219	Cecil et. al. 1972	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	4	0/5/25/50	mg/kg diet	N	na	DLY	U	FD	28	w	NR	NR	LB	F	C	Lab	REP	EGG	EGWT	EG	50.0		N	1.6	N	0.07903238	2.47		10	10	5	10	5	10	4	1	10	4	69
103	3219	Cecil et. al. 1972	DDT	o,p' - DDT	100	Chicken (*Gallus domesticus*)	4	0/5/25/50	mg/kg diet	N	na	DLY	U	FD	28	w	NR	NR	LB	F	C	Lab	REP	EGG	EGWT	EG	50.0		N	1.6	N	0.07903238	2.47		10	10	5	10	5	10	4	1	10	4	69
104	3219	Cecil et. al. 1972	DDE	p,p' - DDE	100	Chicken (*Gallus domesticus*)	4	0/5/25/50	mg/kg diet	N	na	DLY	U	FD	28	w	NR	NR	LB	F	C	Lab	REP	EGG	EGWT	EG	50.0		N	1.6	N	0.07903238	2.47		10	10	5	10	5	10	4	1	10	4	69
105	3440	Lillie et al., 1973	DDT	DDT - Pure isomers	100	Chicken (*Gallus domesticus*)	3	0/10/50	mg/kg diet	N	na	ADL	U	FD	40	w	26	w	LB	F	V	Lab	REP	REP	FERT	WO	50.0		Y	2.121	Y	0.119	2.72		10	10	5	10	7	10	4	1	10	4	71
106	3440	Lillie et al., 1973	DDT	DDT - Technical	100	Chicken (*Gallus domesticus*)	3	0/10/50	mg/kg diet	N	na	ADL	U	FD	40	w	26	w	LB	F	V	Lab	REP	REP	FERT	WO	50.0		Y	2.078	Y	0.114	2.74		10	10	5	10	7	10	4	1	10	4	71
107	3440	Lillie et al., 1973	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	2	0/50	mg/kg diet	N	na	ADL	U	FD	28	w	72	w	LB	F	V	Lab	REP	REP	TPRD	WO	50.0		Y	2.153	Y	0.118	2.74		10	10	5	10	7	10	4	1	10	4	71
108	3427	Kolaja, 1977	DDE	DDE SO4	100	Mallard duck (*Anas platyrhynchos*)	3	0/10/50	mg/kg diet	N	na	ADL	U	FD	7	d	NR	NR	LB	F	C	Lab	REP	EGG	ESTH	EG	50.0		Y	1.1	N	0.06192552	2.83		10	10	5	10	5	10	4	1	10	4	69
109	3427	Kolaja, 1977	DDT	DDT SO4	100	Mallard duck (*Anas platyrhynchos*)	3	0/10/50	mg/kg diet	N	na	ADL	U	FD	14	d	NR	NR	LB	F	C	Lab	REP	EGG	ESTH	EG	50.0		Y	1.1	N	0.06192552	2.83		10	10	5	10	5	10	4	1	10	4	69
110	3442	Lillie et al., 1972	DDT	o,p' - DDT	100	Chicken (*Gallus domesticus*)	4	0/5/25/50	mg/kg diet	N	na	ADL	U	FD	28	w	26	w	LB	F	V	Lab	REP	REP	FERT	WO	50.0		Y	1.893	Y	0.1133	2.99		10	10	5	10	7	10	4	10	10	4	80
111	3442	Lillie et al., 1972	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	4	0/5/25/50	mg/kg diet	N	na	ADL	U	FD	28	w	26	w	LB	F	V	Lab	REP	REP	FERT	WO	50.0		Y	1.8839999	Y	0.1135	3.01		10	10	5	10	7	10	4	10	10	4	80
112	3442	Lillie et al., 1972	DDE	p,p' - DDE	100	Chicken (*Gallus domesticus*)	4	0/5/25/50	mg/kg diet	N	na	ADL	U	FD	28	w	26	w	LB	F	V	Lab	REP	REP	FERT	WO	50.0		Y	1.790	Y	0.1084	3.03		10	10	5	10	7	10	4	10	10	4	80
113	3166	Arscott et al 1972	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	32	w	NR	NR	SM	M	V	Lab	REP	REP	GREP	SM	100		Y	2.21	Y	0.068	3.08		10	10	5	10	7	10	4	3	3	4	66

Appendix 5.1 Avian Toxicity Data Extracted for Wildlife Toxiicty Reference Value (TRV)
DDT and Metabolites
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Ref				Exposure																			Effects						Conversion to mg/kg bw/day				Result		Data Evaluation Score												
Result #	Ref No.	Reference		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	General Effect Group	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
114	3801	Azevedo et al., 1965	DDT	DDT - Technical	88.5	Pheasant (*Phasianus colchicus*)	4	0/0.464/5.10/6.86	mg/kg bw/d	N	na	ADL	UX	FD	105	d	NR	NR	LB	F	C	FieldA	REP	REP	PROG	WO	5.10	6.86	N	1.3	N	0.0690399	4.51	6.07	10	10	10	10	10	10	10	10	4	85
115	3579	Scott, 1977	DDT	DDT - Commercial	94.5	Chicken (*Gallus domesticus*)	3	0/20/100	mg/kg diet	N	na	ADL	U	FD	10	w	NR	mo	LB	F	C	Lab	REP	REP	TPRD	WO	100		N	1.6	N	0.07903238	4.67		10	10	5	10	5	10	4	8	10	4	76
116	3580	Scott et al., 1975	DDT	DDT - Commercial	94.5	Chicken (*Gallus domesticus*)	3	0/20/100	mg/kg diet	N	na	ADL	U	FD	10	w	NR	NR	LB	F	C	Lab	REP	REP	PROG	WO	100		N	1.6	N	0.07903238	4.67		10	10	5	10	5	10	4	10	10	4	78
117	3239	Davison et al 1976	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	4	0/2.5/10/40	mg/kg diet	N	na	ADL	U	FD	12	w	9	w	LB	F	V	Lab	REP	EGG	EGWT	EG	40.0		N	0.1	N	0.01299939	5.20		10	10	5	10	5	10	4	1	10	4	69
118	71	Chang and Stokstad, 1975	DDT	DDT	100	Japanese quail (*Coturnix japonica*)	3	0/50/200	mg/kg diet	N	na	DLY	U	FD	14	w	2	w	LB	F	C	Lab	REP	EGG	ESTH	EG	50.0	200	Y	0.181	N	0.0191281	5.28	21.1	10	10	5	10	6	10	8	10	10	4	83
119	3593	Simpson et al., 1972	DDT	o,p' - DDT	100	Turkey (*Meleagris gallopavo*)	2	0/264.6	mg/kg diet	N	na	ADL	U	FD	15	w	6	w	JV	M	C	Lab	REP	REP	RHIS	TE	265		N	14.3	N	0.328887	6.09		10	10	5	10	5	10	4	1	10	4	69
120	3593	Simpson et al., 1972	DDT	p,p' - DDT	100	Turkey (*Meleagris gallopavo*)	2	0/264.6	mg/kg diet	N	na	ADL	U	FD	15	w	6	w	JV	M	C	Lab	REP	REP	RHIS	TE	265		N	14.3	N	0.328887	6.09		10	10	5	10	5	10	4	1	10	4	69
121	3324	Grassle and Biessmann, 1982	DDT	DDT - Technical	100	Japanese quail (*Coturnix japonica*)	3	0/50/250	mg/kg diet	N	na	ADL	U	FD	70	d	5	w	LB	B	V	Lab	REP	EGG	CRAK	EG	50.0	250	N	0.1	N	0.01299939	6.50	32.5	10	10	5	10	5	10	8	10	10	4	82
122	3548	Pepperell, 1972	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	4	0/1.5/15/75	mg/org/d	N	na	ADL	U	FD	6	w	NR	NR	LB	F	C	Lab	REP	EGG	FTEG	EG	15.0	75.0	N	1.6	Y	0.07903238	9.37	46.9	10	10	5	10	6	10	8	10	10	4	83
123	944	Davison and Sell 1972	DDT	p,p' - DDT	99	Chicken (*Gallus domesticus*)	3	0/100/200	mg/kg diet	N	na	DLY	U	FD	12	w	30	w	LB	F	V	Lab	REP	REP	NOPN	EG	200		Y	1.569	N	0.07803214	9.85		10	10	5	10	6	10	4	10	10	4	79
124	71	Chang and Stokstad, 1975	DDT	DDT	100	Japanese quail (*Coturnix japonica*)	3	0/25/100	mg/kg diet	N	na	DLY	U	FD	14	w	2	w	LB	F	C	Lab	REP	EGG	ESTH	EG	100		Y	0.1416	N	0.01630291	11.5		10	10	5	10	6	10	4	10	10	4	79
125	3580	Scott et al., 1975	DDT	DDT - Commercial	94.5	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	10	w	NR	NR	LB	F	C	Lab	REP	REP	PROG	WO	100		N	0.1	N	0.01299939	12.3		10	10	5	10	5	10	4	6	10	4	74
126	3579	Scott, 1977	DDT	DDT - Commercial	94.5	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	10	w	NR	NR	LB	F	C	Lab	REP	REP	TPRD	WO	100		N	0.09	N	0.01213766	12.7		10	10	5	10	5	10	4	6	10	4	74
127	3642	Waibel et al., 1972	DDT	DDT	100	Chicken (*Gallus domesticus*)	2	0/300	mg/kg diet	N	na	ADL	U	FD	30	d	9	mo	LB	F	C	Lab	REP	REP	TPRD	WO	300		Y	1.8380001	N	0.08649916	14.1		10	10	5	10	6	10	4	1	10	4	70
128	3575	Robson et al., 1976	DDE	DDE	100	Japanese quail (*Coturnix japonica*)	3	0/100/300	mg/kg diet	N	na	ADL	U	FD	168	d	1	d	LB	F	V	Lab	REP	REP	TPRD	WO	100	300	Y	0.134	Y	0.019	14.2	42.5	10	10	5	10	7	10	10	10	10	4	86
129	3204	Britton, 1975	DDT	DDT - Technical	98	Chicken (*Gallus domesticus*)	4	0/300/600/1200	mg/kg diet	N	na	DLY	U	FD	28	d	19	mo	LB	F	C	Lab	REP	EGG	ESTH	EG	300	600	N	1.6	N	0.07903238	14.5	29.0	10	10	5	10	5	10	10	10	10	4	84
130	3575	Robson et al., 1976	DDT	p,p' - DDT	99	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	168	d	1	d	LB	F	V	Lab	REP	REP	TPRD	WO	100		Y	0.121	Y	0.020	16.4		10	10	5	10	7	10	4	1	10	4	71
131	71	Chang and Stokstad, 1975	DDE	DDE	100	Japanese quail (*Coturnix japonica*)	5	0/25/50/100/200	mg/kg diet	N	na	DLY	U	FD	14	w	2	w	LB	F	C	Lab	REP	EGG	CRAK	EG	200		Y	0.154	N	0.01721865	22.4		10	10	5	10	6	10	4	10	10	4	79
132	3220	Cecil et al., 1978	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	4	0/5/50/500	mg/kg diet	N	na	ADL	U	FD	30	d	11	mo	SM	M	C	Lab	REP	REP	TEWT	TE	500		Y	1.98	N	0.09079293	22.9		10	10	5	10	6	10	4	1	6	4	66
133	3313	George and Sundararaj 1995	DDT	DDT	100	Chicken (*Gallus domesticus*)	6	0/6.25/12.5/25/37.5/50	mg/kg bw/d	N	na	DLY	U	OR	47	w	30	w	JV	M	M	Lab	REP	REP	SPCV	SM	25.0	37.5	N	1.3	N	0.0690399	25.0	37.5	10	8	10	10	10	10	10	10	4	92
134	3239	Davison et al 1976	DDE	p,p' - DDE	100	Japanese quail (*Coturnix japonica*)	5	0/2/10/40/200	mg/kg diet	N	na	DLY	U	FD	13	w	14	w	LB	F	V	Lab	REP	EGG	EGWT	EG	200		Y	0.112	Y	0.014	25.0		10	10	5	10	7	10	4	1	10	4	71
135	3595	Smith et al., 1969	DDT	p,p' - DDT	99	Japanese quail (*Coturnix japonica*)	4	0/100/200/400	mg/kg diet	N	na	ADL	U	FD	40	d	8	w	LB	F	C	Lab	REP	EGG	FTEG	EG	200	400	N	0.1	N	0.01299939	25.7	51.5	10	10	5	10	5	10	10	10	10	4	84
136	14916	Cooke, 1970	DDT	o,p' - DDT	100	Japanese quail (*Coturnix coturnix*)	2	0/37.6	mg/kg bw/d	N	na	X per w	U	GV	3	w	73	d	JV	M	V	Lab	REP	REP	TEWT	TE	37.6		Y	0.114	N	0.0141569	37.6		10	8	5	10	10	10	4	8	10	4	79
137	1042	Mendenhall et al., 1983	DDE	DDE	100	Barn owl (*Tyto alba*)	2	0/2.83	mg/kg diet	Y	NR	NR	M	FD	1	yr	1.5- 6	yr	LB	F	V	Lab	REP	REP	PROG	WO	2.83		N	0.568	N	0.04027205	0.211		10	10	10	10	5	10	4	10	10	4	83
138	3636	Vanglider and Peterle, 1983	DDE	DDE	100	Mallard duck (*Anas platyrhynchos*)	2	0/5	mg/kg diet	N	na	ADL	U	FD	61	d	NR	NR	LB	F	C	Lab	REP	EGG	EGWT	WO		5.0	N	1.1	N	0.06192552	0.281		10	10	5	10	5	10	4	10	10	4	78
139	3157	Dasadhikari, et al, 1996	DDD	o,p' - DDD	100	Pigeon (*Coumba livia*)	2	0/0.1	mg/org/d	N	na	DLY	U	OR	5	d	NR	NR	AD	M	C	Lab	REP	REP	TEDG	TE		0.100	N	0.34	N	0.02883472	0.294		10	8	10	10	5	10	4	10	3	4	74
140	3545	Peakall et al., 1973	DDE	DDE	100	American kestrel (*Falco sparverius*)	4	0/3/6/10	mg/kg diet	N	na	ADL	U	FD	14	d	NR	NR	LB	F	C	Lab	REP	EGG	ESTH	EG		3.0	Y	0.12	N	0.0146376	0.366		10	10	5	10	5	10	4	10	10	4	78
141	3722	Heath et al, 1969	DDD	DDD - Technical	84	Mallard duck (*Anas platyrhynchos*)	3	0/10/40	mg/kg diet	N	na	ADL	U	FD	1	yr	NR	NR	LB	F	C	Lab	REP	REP	RSUC	WO		10.0	N	1.1	N	0.06192552	0.473		10	10	5	10	5	10	4	10	10	4	78
142	3217	Cecil et al., 1973	DDT	DDT - Technical	100	Chicken (*Gallus domesticus*)	3	0/10/50	mg/kg diet	N	na	DLY	U	FD	2	mo	2	yr	LB	F	C	NR	REP	EGG	ESTH	EG		10.0	N	1.6	N	0.07903238	0.494		10	10	5	10	5	10	4	10	10	4	78
143	3217	Cecil et al., 1973	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	3	0/10/50	mg/kg diet	N	na	DLY	U	FD	2	mo	2	yr	LB	F	C	NR	REP	EGG	ESTH	EG		10.0	N	1.6	N	0.07903238	0.494		10	10	5	10	5	10	4	10	10	4	78
144	3356	Haseltine et al., 1974	DDE	p,p' - DDE	99.9	Mallard duck (*Anas platyrhynchos*)	2	0/10	mg/kg diet	N	na	ADL	U	FD	5	mo	NR	NR	LB	F	V	Lab	REP	EGG	ESTH	EG		10.0	N	1.1	N	0.06192552	0.562		10	10	5	10	5	10	4	10	10	4	78
145	3427	Kolaja, 1977	DDT	DDT	100	Mallard duck (*Anas platyrhynchos*)	3	0/10/50	mg/kg diet	N	na	ADL	U	FD	14	d	NR	NR	LB	F	C	Lab	REP	EGG	ESTH	EG		10.0	Y	1.1	N	0.06192552	0.563		10	10	5	4	6	10	4	10	10	4	73
146	3427	Kolaja, 1977	DDE	DDE	100	Mallard duck (*Anas platyrhynchos*)	3	0/10/50	mg/kg diet	N	na	ADL	U	FD	7	d	NR	NR	LB	F	C	Lab	REP	EGG	ESTH	EG		10.0	Y	1.1	N	0.06192552	0.563		10	10	5	4	6	10	4	10	10	4	73
147	3450	Longcore et al., 1971	DDE	p,p' - DDE	100	Black duck (*Anas rubripes*)	3	0/10/30	mg/kg diet	N	na	ADL	U	FD	28	d	NR	NR	LB	F	V	Lab	REP	EGG	ESTH	EG		10.0	N	1.1	N	0.06192552	0.563		10	10	5	10	5	10	4	10	10	4	78
148	3451	Longcore and Stendell, 1977	DDE	p,p' - DDE	100	Black duck (*Anas rubripes*)	2	0/10	mg/kg diet	N	na	ADL	U	FD	8	mo	NR	NR	LB	F	V	Lab	REP	EGG	ESTH	EG		10.0	N	1.1	N	0.06192552	0.563		10	10	5	10	5	10	4	10	10	4	78
149	3637	Vangilder and Peterle, 1980	DDE	DDE	100	Mallard duck (*Anas platyrhynchos*)	2	0/10	mg/kg diet	N	na	ADL	U	FD	66	d	NR	NR	LB	F	C	Lab	REP	EGG	ESTH	EG		10.0	N	1.1	N	0.06192552	0.563		10	10	5	10	5	10	4	10	10	4	78
150	3722	Heath et al, 1969	DDE	p,p' - DDE	100	Mallard duck (*Anas platyrhynchos*)	3	0/10/40	mg/kg diet	N	na	ADL	U	FD	1	yr	NR	NR	LB	F	C	Lab	REP	REP	RSUC	WO		10.0	N	1.1	N	0.06192552	0.563		10	10	5	10	5	10	4	10	10	4	78
151	3341	Haegele and Hudson 1977	DDE	p,p' - DDE	100	Ringed turtle dove (*Streptopelia risoria*)	3	0/10/50	mg/kg diet	N	na	ADL	U	FD	63	d	NR	NR	SM	M	C	Lab	REP	REP	COUR	WO		10.0	N	0.152	N	0.01707274	1.12		10	10	5	10	5	10	4	10	6	4	74
152	3545	Peakall et al., 1973	DDE	DDE	100	Ringed turtle dove (*Streptopelia risoria*)	2	0/10	mg/kg diet	N	na	ADL	U	FD	14	d	NR	NR	LB	F	C	Lab	REP	EGG	ESTH	EG		10.0	Y	0.149	N	0.01685261	1.13		10	10	5	10	5	10	4	10	10	4	78
153	14926	Peakall, 1970	DDT	p,p' - DDT	100	Ringed turtle dove (*Streptopelia risoria*)	2	0/10	mg/kg diet	N	na	NR	U	FD	29	d	NR	NR	LB	B	C	Lab	REP	REP	OEGP	WO		10.0	N	0.146	N	0.01663094	1.14		10	10	5	10	5	10	4	10	10	4	78
154	3570	Richie and Peterle, 1979	DDE	p,p' - DDE	99.9	Ringed turtle dove (*Streptopelia risoria*)	2	0/10	mg/kg diet	N	na	ADL	U	FD	90	d	NR	NR	SM	B	C	Lab	REP	REP	GREP	WO		10.0	N	0.144	N	0.01648	1.14		10	10	5	10	5	10	4	10	10	4	78
155	3263	Wiemeyer and Porter, 1970	DDE	p,p' - DDE	99	American kestrel (*Falco sparverius*)	2	0/10	mg/kg diet	N	na	NR	U	FD	1	yr	NR	NR	NR	B	V	NR	REP	EGG	ESTH	EG		10.0	N	0.111	N	0.01391324	1.24		10	10	5	10	5	10	4	10	10	4	78
156	1111	Shellenberger, 1978	DDT	DDT	100	Quail (*Coturnix japonica*)	3	0/5/50	mg/kg diet	N	na	DLY	U	FD	5	w	5	d	LB	F	C	Lab	REP	REP	PROG	WO		5	N	0.012	N	0.00326941	1.36		10	10	5	10	5	10	4	10	10	4	78
157	3560	Pritchard et al., 1972	DDE	p,p' - DDE	100	Duck (*Anas platyrhynchos*)	2	0/40	mg/kg diet	N	na	ADL	U	FD	2	w	NR	NR	LB	F	C	Lab	REP	EGG	ESTH	EG		40.0	Y	4	N	0.14350401	1.44		10	10	5	10	6	10	4	10	10	4	79
158	3571	Risebrough and Anderson, 1975	DDE	p,p' - DDE	100	Mallard duck (*Anas platyrhynchos*)	2	0/34	mg/kg diet	N	na	ADL	M	FD	30	d	1	yr	LB	B	V	FieldU	REP	EGG	ESTH	EG		34.0	N	1.6	N	0.07903	1.68		10	10	10	10	5	10	4	10	10	4	83
159	3461	Lundholm, 1993	DDE	p,p' - DDE	100	Duck (*Anas platyrhynchos*)	2	0/40	mg/kg diet	N	na	ADL	U	FD	45	d	1	yr	LB	F	C	FieldU	REP	EGG	ESIN	EG		40.0	N	1.1	N	0.0619255	2.25		10	10	5	10	5	10	4	10	10	4	78
160	3330	Greenburg et al, 1979	DDE	p,p' - DDE	100	Mallard duck (*Anas platyrhynchos*)	2	0/39	mg/kg diet	N	na	ADL	M	FD	50	d	1	yr	LB	F	V	FieldU	REP	EGG	GEGG	EG		39.0	N	1.1	N	0.06192552	2.20		10	10	10	10	5	10	4	10	10	4	83
161	3457	Lundholm, 1980	DDE	p,p' - DDE	100	Duck (*Anas platyrhynchos*)	2	0/40.0	mg/kg diet	N	na	ADL	U	FD	48	d	1	y	LB	F	U	Lab	REP	EGG	ESIN	EG		40	N	1.1	N	0.06192	2.25		10	10	5	10	5	10	4	10	10	4	78
162	3457	Lundholm, 1980	DDE	o,p' - DDE	100	Duck (*Anas platyrhynchos*)	2	0/40.0	mg/kg diet	N	na	ADL	U	FD	48	d	1	y	LB	F	U	Lab	REP	EGG	ESIN	EG		40	N	1.1	N	0.06192	2.25		10	10	5	10	5	10	4	10	10	4	78
163	178	Haegele and Hudson 1974	DDE	p,p' - DDE	100	Mallard duck (*Anas platyrhynchos*)	2	0/40	mg/kg diet	N	na	DLY	U	FD	96	d	NR	NR	LB	F	C	Lab	REP	EGG	ESTH	EG		40.0	N	1.1	N	0.06192552	2.25		10	10	5	10	5	10	4	10	10	4	78
164	2668	Haegele et al., 1974	DDE	p,p' - DDE	100	Mallard duck (*Anas platyrhynchos*)	2	0/40	mg/kg diet	N	na	ADL	U	FD	76	d	NR	NR	LB	F	C	FieldA	REP	EGG	ESTH	SL		40.0	N	1.1	N	0.06192552	2.25		10	10	5	10	5	10	4	10	10	4	78
165	3462	Lundholm, 1985	DDE	p,p' - DDE	100	Duck (*Anas platyrhynchos*)	2	0/40	mg/kg diet	N	na	ADL	U	FD	45	d	1	yr	LB	F	C	FieldA	REP	EGG	ESIN	EG		40.0	N	1.1	N	0.06192552	2.25		10	10	5	10	5	10	4	10	10	4	78
166	3545	Peakall et al., 1973	DDE	DDE	100	Duck (*Anas platyrhynchos*)	2	0/40	mg/kg diet	N	na	ADL	U	FD	14	d	NR	NR	LB	F	C	Lab	REP	EGG	ESTH	EG		40.0	N	1.1	N	0.06192552	2.25		10	10	5	10	5	10	4	10	10	4	78
167	3399	Jefferies 1971	DDT	p,p' - DDT	100	Bengalese Finch (*Lonchura striata*)	4	0/34/139/1205	ug/org/d	N	na	DLY	U	FD	6	w	200-300	d	LB	F	C	Lab	REP	REP	PROG	WO		34.0	Y	0.01413	N	0.00363635	2.41		10	10	5	10	6	10	4	10	10	4	79
168	3399	Jefferies 1971	DDE	p,p' - DDE	100	Bengalese Finch (*Lonchura striata*)	4	0/18/168/840	ug/org/d	N	na	DLY	U	FD	6	w	200-300	d	LB	F	C	Lab	REP	REP	PROG	WO		34.0	Y	0.01413	N	0.00363635	2.41		10	10	5	10	6	10	4	10	10	4	79
169	232	Kolaja and Hinton, 1979	DDT	DDT	100	Mallard duck (*Anas platyrhynchos*)	2	0/50	mg/kg diet	N	na	ADL	U	FD	6	mo	NR	NR	LB	B	C	Lab	REP	EGG	EGWT	EG		50.0	N	1.2	N	0.06553449	2.73		10	10	5	4	5	10	4	10	10	4	72
170	3483	McLane and Hall, 1972	DDE	DDE	100	Screech owl (*Otus asio*)	2	0/2.8	mg/kg bw/d	N	na	NR	U	FD	20	mo	NR	NR	LB	F	V	FieldA	REP	EGG	ESTH	EG		2.80	N	0.194	N	0.0200116	2.8		10	10	5	10	10	10	4	10	10	4	83
171	3428	Kolaja and Hinton, 1977	DDT	DDT	100	Mallard duck (*Anas platyrhynchos*)	2	0/50	mg/kg diet	N	na	ADL	U	FD	6	mo	NR	NR	LB	F	C	Lab	REP	EGG	ESTH	EG		50.0	N	1.1	N	0.06192552	2.81		10	10	5	10	5	10	4	10	10	4	78
172	3378	Kolaja and Hinton, 1976	DDT	DDT	100	Mallard duck (*Anas platyrhynchos*)	2	0/75	mg/kg diet	N	na	ADL	U	FD	7	w	NR	NR	LB	F	C	Lab	REP	EGG	ESTH	EG		75.0	Y	1.1	N	0.06192552	4.22		10	10	5	10	5	10	4	10	10	4	78

Appendix 5.1 Avian Toxicity Data Extracted for Wildlife Toxiicty Reference Value (TRV)
DDT and Metabolites
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Ref				Exposure																				Effects						Conversion to mg/kg bw/day				Result		Data Evaluation Score											
Result #	Ref No.	Reference		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	General Effect Group	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
173	3356	Haseltine et al., 1974	DDE	p,p' - DDE	99.9	Ringed turtle dove (*Streptopelia risoria*)	2	0/40	mg/kg diet	N	na	ADL	U	FD	3	w	NR	NR	LB	F	V	Lab	REP	EGG	ESTH	EG		40.0	N	0.144	N	0.01648227		4.57	10	10	5	10	5	10	4	10	10	4	78
174	3384	Haegele and Hudson, 1973	DDE	p,p' - DDE	100	Ringed turtle dove (*Streptopelia risoria*)	2	0/40	mg/kg diet	N	na	ADL	U	FD	126	d	NR	NR	LB	B	C	Lab	REP	REP	PROG	WO		40.0	N	0.144	N	0.01648227		4.58	10	10	5	10	5	10	4	10	10	4	78
175	3578	Sauter and Steele, 1972	DDT	DDT	100	Chicken (*Gallus domesticus*)	4	0/0.1/1/10	mg/kg diet	N	na	NR	U	FD	10	w	NR	NR	LB	F	C	Lab	REP	REP	TPRD	WO		0.100	N	1.6	N	0.07903238		4.94	10	10	5	4	5	10	4	10	10	4	72
176	14923	Locke et al, 1966	DDT	p,p' - DDT - Technical	100	Bald eagle (*Haliaeetus leucocephalus*)	3	0/160/4000	mg/kg diet	N	na	DLY	U	FD	23	d	NR	NR	NR	NR	V	Lab	REP	REP	TEDG	TE		160	N	5.3499999	N	0.17341286		5.19	10	10	5	10	5	10	4	10	6	4	74
177	14920	Genelly and Rudd, 1956	DDT	DDT	100	Ring-necked pheasant (*Phasianus colchicus*)	3	0/5.72/20.84	mg/org/d	N	na	NR	U	FD	10	w	NR	NR	LB	F	C	Lab	REP	REP	DEYO	WO		5.72	N	0.95	Y	0.0572		6.02	10	10	5	10	6	10	4	10	10	4	79
178	71	Chang and Stokstad, 1975	DDE	DDE	100	Japanese quail (*Coturnix japonica*)	3	0/50/200	mg/kg diet	N	na	DLY	U	FD	14	w	2	w	LB	F	C	Lab	REP	EGG	ESTH	EG		50.0	Y	0.11	N	0.01383151		6.29	10	10	5	10	6	10	4	10	10	4	79
179	3169	Balasubramaniam and Sundararaj 1	DDT	DDT - Technical	100	Chicken (*Gallus domesticus*)	4	0/12.5/25/37.5	mg/kg bw/d	N	na	DLY	U	OR	24	w	4	w	JV	M	C	NR	REP	REP	TEDG	TE		12.5	N	1.3	N	0.0690399		12.5	10	8	10	10	10	10	4	10	10	4	86
180	3218	Cecil et al., 1971	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	74	d	39	d	LB	F	C	Lab	REP	REP	NSTI	WO		100	N	0.1	N	0.0130		13.0	10	10	5	10	5	10	4	10	10	4	78
181	3218	Cecil et al., 1971	DDE	p,p' - DDE	100	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	74	d	39	d	LB	F	C	Lab	REP	REP	NSTI	WO		100	N	0.1	N	0.0130		13.0	10	10	5	10	5	10	4	10	10	4	78
182	14917	DeWitt, 1955	DDT	DDT	100	Quail (*Coturnix japonica*)	2	0/13.8	mg/kg bw/d	N	na	ADL	U	FD	120	d	NR	NR	LB	F	C	Lab	REP	REP	HTCH	WO		13.8	N	0.100	N	0.01299939		13.8	10	10	5	10	10	10	4	10	10	4	83
183	3205	Britton et. al. 1974	DDT	DDT - Technical	100	Chicken (*Gallus domesticus*)	3	0/300/600	mg/kg diet	N	na	DLY	U	FD	133	d	12	mo	LB	F	C	Lab	REP	REP	PRWT	WO		300	N	1.6	N	0.07903238		14.8	10	10	5	10	5	10	4	10	10	4	78
184	3409	Jones and Summers 1968	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/3.6	mg/org/d	N	na	DLY	U	FD	14	d	NR	NR	LB	F	C	NR	REP	REP	RSUC	WO		3.60	N	0.100	N	0.01299939		36.0	10	10	5	10	10	10	4	10	10	4	83
Growth																																															
185	3220	Cecil et al., 1978	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	4	0/5/50/500	mg/kg diet	N	na	ADL	U	FD	30	d	11	mo	SM	M	C	Lab	GRO	GRO	BDWT	WO	5.0	50.0	Y	2.0369999	N	0.09248603	0.227	2.27	10	10	5	10	6	8	8	10	6	4	77
186	3440	Lillie et al., 1973	DDT	DDT - Pure isomers	100	Chicken (*Gallus domesticus*)	3	0/10/50	mg/kg diet	N	na	ADL	U	FD	40	w	26	w	SM	F	V	Lab	GRO	GRO	BDWT	WO	10.0	50.0	Y	2.187	Y	0.122	0.558	2.79	10	10	5	10	7	8	8	10	10	4	82
187	3332	Greichus and Hannon 1973	DDT	DDT and metabolites	100	Double Crested Cormorants (*Phalacrocorax auritus*)	4	0/5/12.5/25	mg/kg diet	N	na	DLY	U	FD	9	w	NR	NR	JV	B	M	Lab	GRO	GRO	BDWT	WO	25.0		Y	2.2	N	0.09723893	1.10		10	10	5	10	6	8	4	1	10	4	68
188	3442	Lillie et al., 1972	DDE	p,p' - DDE	100	Chicken (*Gallus domesticus*)	4	0/5/25/50	mg/kg diet	N	na	ADL	U	FD	28	w	26	w	SM	F	V	Lab	GRO	GRO	BDWT	WO	25.0	50.0	Y	1.911	Y	0.1127	1.47	2.95	10	10	5	10	7	8	10	10	10	4	84
189	3440	Lillie et al., 1973	DDT	DDT - Technical	71	Chicken (*Gallus domesticus*)	3	0/10/50	mg/kg diet	N	na	ADL	U	FD	40	w	26	w	SM	F	C	Lab	GRO	GRO	BDWT	WO	50.0		Y	2.204	Y	0.120	1.93		10	10	5	10	7	8	4	1	10	4	69
190	3442	Lillie et al., 1972	DDT	o,p' - DDT	100	Chicken (*Gallus domesticus*)	4	0/5/25/50	mg/kg diet	N	na	ADL	U	FD	28	w	26	w	SM	F	V	Lab	GRO	GRO	BDWT	WO	50.0		Y	1.893	Y	0.1133	2.99		10	10	5	10	7	8	4	10	10	4	78
191	3442	Lillie et al., 1972	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	4	0/5/25/50	mg/kg diet	N	na	ADL	U	FD	28	w	26	w	SM	F	V	Lab	GRO	GRO	BDWT	WO	50.0		Y	1.884	Y	0.1135	3.01		10	10	5	10	7	8	4	10	10	4	78
192	944	Davison and Sell 1972	DDT	p,p' - DDT	99	Chicken (*Gallus domesticus*)	3	0/100/200	mg/kg diet	N	na	DLY	U	FD	12	w	30	w	JV	F	V	Lab	GRO	GRO	BDWT	WO	200		Y	1.569	N	0.07803214	9.85		10	10	5	10	6	8	4	10	10	4	77
193	71	Chang and Stokstad, 1975	DDT	DDT	100	Japanese quail (*Coturnix japonica*)	3	0/25/100	mg/kg diet	N	na	DLY	U	FD	5	w	2	w	JV	F	C	Lab	GRO	GRO	BDWT	WO	100		Y	0.1416	N	0.01630291	11.5		10	10	5	10	6	8	4	10	10	4	77
194	3209	Bunyan et al., 1972	DDE	p,p' - DDE	100	Japanese quail (*Coturnix japonica*)	4	0/10/50/100	mg/kg diet	N	na	ADL	U	FD	21	d	4	w	JV	F	C	Lab	GRO	GRO	BDWT	WO	100		Y	0.12	N	0.0146376	12.2		10	10	5	10	6	8	4	10	10	4	77
195	3209	Bunyan et al., 1972	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	21	d	4	w	JV	F	C	Lab	GRO	GRO	BDWT	WO	100		Y	0.117	N	0.01439833	12.3		10	10	5	10	6	8	4	10	10	4	77
196	3591	Sifri et al., 1975	DDT	p,p' - DDT	100	Mallard duck (*Anas platyrhynchos*)	2	0/100	ug/g diet	N	na	ADL	U	FD	14	d	8	d	JV	B	C	Lab	GRO	GRO	BDWT	WO	100		N	0.092	N	0.01231	13.4		10	10	5	10	5	8	4	1	10	4	67
197	3591	Sifri et al., 1975	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	2	0/100	ug/g diet	N	na	ADL	U	FD	14	d	8	d	JV	B	C	Lab	GRO	GRO	BDWT	WO	100		N	0.084	N	0.0116	13.8		10	10	5	10	5	8	4	1	10	4	67
198	3642	Waibel et al., 1972	DDT	DDT	100	Chicken (*Gallus domesticus*)	2	0/300	mg/kg diet	N	na	ADL	U	FD	30	d	9	mo	JV	F	C	Lab	GRO	GRO	BDWT	WO	300		Y	1.8380001	N	0.08649916	14.1		10	10	5	10	6	8	4	1	10	4	68
199	3575	Robson et al., 1976	DDE	DDE	100	Japanese quail (*Coturnix japonica*)	3	0/100/300	mg/kg diet	N	na	ADL	U	FD	168	d	1	d	JV	F	V	Lab	GRO	GRO	BDWT	WO	100	300	Y	0.134	Y	0.019	14.2	42.5	10	10	5	10	7	8	10	10	10	4	84
200	3575	Robson et al., 1976	DDT	p,p' - DDT	99	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	168	d	1	d	JV	F	V	Lab	GRO	GRO	BDWT	WO	100		Y	0.121	Y	0.02	16.4		10	10	5	10	7	8	4	1	10	4	69
201	3208	Bunyan and Page, 1973	DDE	p,p' - DDE	100	Japanese quail (*Coturnix japonica*)	2	0/150	mg/kg diet	N	na	ADL	U	FD	21	d	4	w	JV	F	C	Lab	GRO	GRO	BDWT	WO	150		Y	0.126	N	0.01510999	18.0		10	10	5	10	6	8	4	10	10	4	77
202	71	Chang and Stokstad, 1975	DDT	DDT	100	Japanese quail (*Coturnix japonica*)	3	0/50/200	mg/kg diet	N	na	DLY	U	FD	5	w	2	w	JV	F	C	Lab	GRO	GRO	BDWT	WO	200		Y	0.181	N	0.0191281	21.1		10	10	5	10	6	8	4	1	10	4	68
203	71	Chang and Stokstad, 1975	DDE	DDE	100	Japanese quail (*Coturnix japonica*)	5	0/25/50/100/200	mg/kg diet	N	na	DLY	U	FD	5	w	F	C	JV	F	C	Lab	GRO	GRO	BDWT	WO	200		Y	0.154	N	0.01721865	22.4		10	10	5	10	6	8	4	10	10	4	77
204	3615	Sullivan and Scanlon, 1991	DDT	p,p' - DDT	100	Northern bobwhite quail (*Colinus virginianus*)	2	0/25	mg/kg bw/d	N	na	DLY	U	GV	56	d	NR	NR	NR	F	V	Lab	GRO	GRO	BDWT	WO	25.0		Y	0.193	Y	0.0135	25.0		10	8	10	10	10	8	4	1	3	4	68
205	3239	Davison et al 1976	DDE	p,p' - DDE	100	Japanese quail (*Coturnix japonica*)	5	0/2/10/40/200	mg/kg diet	N	na	DLY	U	FD	13	w	14	w	JV	F	V	Lab	GRO	GRO	BDWT	WO	200		Y	0.112	Y	0.014	25.0		10	10	5	10	7	8	4	1	10	4	69
206	71	Chang and Stokstad, 1975	DDE	DDE	100	Japanese quail (*Coturnix japonica*)	3	0/50/200	mg/kg diet	N	na	DLY	U	FD	5	w	2	w	JV	F	C	Lab	GRO	GRO	BDWT	WO	200		Y	0.11	N	0.01383151	25.1		10	10	5	10	6	8	4	1	10	4	68
207	3583	Sell et al., 1972	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/200	mg/kg diet	N	na	ADL	U	FD	22	d	0	d	JV	B	C	Lab	GRO	GRO	BDWT	WO	200		Y	0.0769	N	0.0109562	28.5		10	10	5	10	6	8	4	10	10	4	77
208	3208	Bunyan and Page, 1973	DDMU	p,p' - DDMU	100	Japanese quail (*Coturnix japonica*)	4	0/50/150/250	mg/kg diet	N	na	ADL	U	FD	21	d	4	w	JV	F	C	Lab	GRO	GRO	BDWT	WO	250		Y	0.118	N	0.01447832	30.7		10	10	5	10	6	8	4	10	10	4	77
209	14919	Genelly and Rudd, 1955	DDT	DDT	100	Ring-necked pheasant (*Phasianus colchicus*)	6	0/50/100/200/400/600	mg/kg diet	N	na	NR	U	FD	90	d	6	mo	JV	F	C	Lab	GRO	GRO	BDWT	WO	600		N	0.95	N	0.05628868	35.6		10	10	5	10	5	8	4	1	10	4	67
210	14916	Cooke, 1970	DDT	o,p' - DDT	100	Japanese quail (*Coturnix coturnix)*	2	0/37.6	mg/kg bw/d	N	na	X per w	U	GV	3	w	73	d	JV	M	V	Lab	GRO	GRO	BDWT	WO	37.6		Y	0.114	N	0.0141569	37.6		10	8	5	10	10	8	4	10	10	4	79
211	11434	Greichus et al, 1975	DDT	DDT - Mixture	100	White pelican (*Pelecanus erythrorhynchos*)	2	0/72	mg/kg diet	N	na	DLY	U	FD	10	w	NR	NR	JV	B	V	NR	GRO	GRO	BDWT	WO	72.0		Y	4.81	Y	0.695	72.0		10	10	5	10	10	8	4	1	10	4	72
212	3440	Lillie et al., 1973	DDT	DDT - Technical	100	Chicken (*Gallus domesticus*)	3	0/10/50	mg/kg diet	N	na	ADL	U	FD	40	w	26	w	SM	F	V	Lab	GRO	GRO	BDWT	WO		10.0	Y	1.976	Y	0.117		0.592	10	10	5	10	7	8	4	10	10	4	78
213	3766	Chura and Stewart 1967	DDT	p,p' - DDT - Technical	100	Bald eagle (*Haliaeetus leucocephalus*)	5	0/10/160/800/4000	mg/kg diet	N	na	DLY	U	FD	55	d	NR	NR	JV	B	V	Lab	GRO	GRO	BDWT	WO		10.0	Y	5.625	Y	0.401		0.713	10	10	5	10	7	8	4	10	10	4	78
214	14896	Mahoney 1975	DDT	DDT - Technical	100	White Throated Sparrow (*Zonotrichia albicollis*)	3	0/5/25	mg/kg diet	N	na	ADL	U	FD	6	w	NR	NR	NR	NR	M	Lab	GRO	GRO	BDWT	WO		5.0	N	0.0259	N	0.00539487		1.04	10	10	5	10	5	8	4	10	6	4	72
215	3166	Arscott et al 1972	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	32	w	NR	NR	SM	M	V	Lab	GRO	GRO	BDWT	WO		100	Y	2.21	Y	0.068		3.08	10	10	5	10	7	8	4	10	3	4	71
216	14919	Genelly and Rudd, 1955	DDT	DDT	100	Ring-necked pheasant (*Phasianus colchicus*)	3	0/5.72/20.84	mg/org/d	N	na	NR	U	FD	74	d	6	mo	JV	F	C	Lab	GRO	GRO	BDWT	WO		5.72	N	0.95	Y	0.000057		6.02	10	10	5	10	6	8	4	10	10	4	77
217	14920	Genelly and Rudd, 1956	DDT	DDT	100	Ring-necked pheasant (*Phasianus colchicus*)	3	0/5.72/20.84	mg/org/d	N	na	NR	U	FD	10	w	NR	NR	SM	F	C	Lab	GRO	GRO	BDWT	WO		5.72	N	0.95	Y	0.0572		6.02	10	10	5	10	6	8	4	10	10	4	77
218	3591	Sifri et al., 1975	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/100	ug/g diet	N	na	ADL	U	FD	14	d	8	d	JV	B	C	Lab	GRO	GRO	BDWT	WO		100	N	0.100	N	0.02999		13.0	10	10	5	10	5	8	4	10	10	4	76
219	14917	DeWitt, 1955	DDT	DDT	100	Quail (*Coturnix japonica*)	2	0/0.01	% in diet	N	na	ADL	U	FD	3	w	NR	NR	JV	NR	C	Lab	GRO	GRO	BDWT	WO		0.010	Y	0.034	N	0.00644044		18.9	10	10	5	10	6	8	4	10	10	4	77
220	3592	Silver and Alpern, 1979	DDT	DDT - Technical	99	Chicken (*Gallus domesticus*)	2	0/400	mg/kg diet	N	na	ADL	U	FD	3	w	8	d	JV	NR	C	Lab	GRO	GRO	BDWT	WO		400	Y	0.173	N	0.01857338		42.5	10	10	5	10	6	8	4	10	10	4	77
Survival																																															
221	1042	Mendenhall et al., 1983	DDE	DDE	100	Barn owl (*Tyto alba*)	2	0/2.83	mg/kg diet	Y	NR	NR	M	FD	1	yr	1.5- 6	yr	MA	B	V	Lab	MOR	MOR	MORT	WO	2.83		N	0.568	N	0.04027205	0.211		10	10	10	10	5	9	4	10	10	4	82
222	14923	Locke et al, 1966	DDT	p,p' - DDT - Technical	100	Bald Eagle (Haliaeetus leucocephalus)	2	0/10	mg/kg diet	N	na	DLY	U	FD	120	d	NR	NR	NR	NR	V	Lab	MOR	MOR	MORT	WO	10.0		N	5.3499999	N	0.17341286	0.324		10	10	5	10	5	9	4	10	6	4	73
223	3239	Davison et al 1976	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	4	0/2.5/10/40	mg/kg diet	N	na	ADL	U	FD	16	w	9	w	JV	F	V	Lab	MOR	MOR	MORT	WO	2.50	10.0	N	0.1	N	0.01299939	0.325	1.30	10	10	5	10	5	9	8	10	10	4	81
224	3801	Azevedo et al., 1965	DDT	DDT - Technical	88.5	Pheasant (*Phasianus colchicus*)	4	0/0.464/5.10/6.86	mg/kg bw/d	N	na	ADL	UX	FD	103	d	NR	NR	AD	M	C	FieldA	MOR	MOR	MORT	WO	0.464	5.10	N	1.3	N	0.0690399	0.411	4.51	10	10	10	10	9	6	10	6	4	85
225	3766	Chura and Stewart 1967	DDT	p,p' - DDT - Technical	100	Bald eagle (*Haliaeetus leucocephalus*)	2	0/10	mg/kg diet	N	na	DLY	U	FD	120	d	NR	NR	JV	B	V	Lab	MOR	MOR	MORT	WO	10.0		Y	5.625	Y	0.401	0.713		10	10	5	10	7	9	4	10	10	4	79
226	942	Davison and Sell, 1974	DDT	DDT - Technical	90	Duck (*Anas platyrhynchos*)	4	0/2/20/200	mg/kg diet	N	na	ADL	U	FD	343	d	2	yr	AD	F	V	Lab	MOR	MOR	MORT	WO	20.0	200	Y	1.48	Y	0.062	0.754	7.54	10	10	5	10	7	9	8	6	6	4	75
227	14896	Mahoney 1975	DDT	DDT - Technical	100	White Throated Sparrow (*Zonotrichia albicollis*)	3	0/5/25	mg/kg diet	N	na	ADL	U	FD	14	w	NR	NR	NR	M	M	Lab	MOR	MOR	MORT	WO	5.0	25	N	0.0259	N	0.00539487	1.04	5.21	10	10	5	10	5	9	8	10	6	4	77
228	3332	Greichus and Hannon 1973	DDT	DDT and metabolites	100	Double Crested Cormorants (*Phalacrocorax auritus*)	4	0/5/12.5/25	mg/kg diet	N	na	DLY	U	FD	9	w	NR	NR	JV	F	M	Lab	MOR	MOR	MORT	WO	25.0		Y	2.2	N	0.09723893	1.10		10	10	5	10	6	9	4	1	10	4	69
229	14921	Jefferies and French 1971	DDT	p,p' - DDT	100	Homing Pigeon (*Columba livia*)	6	0/3/6/9/18/36	mg/kg/d	N	na	DLY	U	OR	56	d	NR	NR	AD	B	V	Lab	MOR	MOR	MORT	WO	18.0	36.0	Y	0.415	N	0.03283011	1.42	2.85	10	8	5	10	6	9	10	10	6	4	78

Appendix 5.1 Avian Toxicity Data Extracted for Wildlife Toxiicty Reference Value (TRV)
DDT and Metabolites

Ref				Exposure																				Effects						Conversion to mg/kg bw/day				Result		Data Evaluation Score											
Result #	Ref No.	Reference		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	General Effect Group	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
230	3442	Lillie et al., 1972	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	4	0/5/25/50	mg/kg diet	N	na	ADL	U	FD	28	w	26	w	SM	F	V	Lab	MOR	MOR	MORT	WO	25.0	50.0	Y	1918	Y	0.1122	1.46	2.93	10	10	5	10	7	9	10	10	10	4	85
231	3440	Lillie et al., 1973	DDT	DDT - Technical	71	Chicken (*Gallus domesticus*)	3	0/10/50	mg/kg diet	N	na	ADL	U	FD	40	w	26	w	SM	F	C	Lab	MOR	MOR	MORT	WO	50.0		Y	2.204	Y	0.120	1.93		10	10	5	10	7	9	4	1	10	4	70
232	942	Davison and Sell, 1974	DDT	p,p' - DDT	99	Duck (*Anas platyrhynchos*)	4	0/2/20/200	mg/kg diet	N	na	ADL	U	FD	167	d	2	yr	AD	F	V	Lab	MOR	MOR	MORT	WO	20.0	200	Y	1.12	Y	0.115	2.03	20.3	10	10	5	10	7	9	8	6	6	4	75
233	2668	Haegele et al., 1974	DDE	p,p' - DDE	100	Mallard duck (*Anas platyrhynchos*)	2	0/40	mg/kg diet	N	na	ADL	U	FD	85	d	NR	NR	SM	F	C	FieldA	MOR	MOR	MORT	WO	40.0		N	1.1	N	0.06192552	2.25		10	10	5	10	5	9	4	10	3	4	70
234	3220	Cecil et al., 1978	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	4	0/5/50/500	mg/kg diet	N	na	ADL	U	FD	30	d	11	mo	SM	M	C	Lab	MOR	MOR	MORT	WO	50.0	500	Y	1.98	N	0.09079293	2.27	22.7	10	10	5	10	6	9	8	10	6	4	78
235	3440	Lillie et al., 1973	DDT	DDT - Pure isomers	100	Chicken (*Gallus domesticus*)	3	0/10/50	mg/kg diet	N	na	ADL	U	FD	40	w	26	w	SM	F	V	Lab	MOR	MOR	SURV	WO	50.0		Y	2.121	Y	0.119	2.72		10	10	5	10	7	9	4	1	10	4	70
236	3440	Lillie et al., 1973	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	2	0/50	mg/kg diet	N	na	ADL	U	FD	28	w	72	w	SM	F	V	Lab	MOR	MOR	SURV	WO	50.0		Y	2.153	Y	0.118	2.74		10	10	5	10	7	9	4	1	10	4	70
237	3440	Lillie et al., 1973	DDT	DDT - Technical	100	Chicken (*Gallus domesticus*)	3	0/10/50	mg/kg diet	N	na	ADL	U	FD	40	w	26	w	SM	F	V	Lab	MOR	MOR	SURV	WO	50.0		Y	2.078	Y	0.114	2.74		10	10	5	10	7	9	4	1	10	4	70
238	3166	Arscott et al 1972	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	32	w	NR	NR	SM	M	V	Lab	MOR	MOR	MORT	WO	100		Y	2.21	Y	0.068	3.08		10	10	5	10	7	9	4	10	3	4	72
239	3254	Dieter, 1975	DDE	DDE	100	Starling (*Sturnus vulgaris*)	3	0/25/100	mg/kg diet	N	na	ADL	U	FD	7	w	NR	NR	NR	M	V	Lab	MOR	MOR	MORT	WO	25.0	100	N	0.0847	N	0.01166743	3.44	13.8	10	10	5	10	5	9	8	10	6	4	77
240	3384	Haegele and Hudson, 1973	DDE	p,p' - DDE	100	Ringed turtle dove (*Streptopelia risoria*)	2	0/40	mg/kg diet	N	na	ADL	U	FD	126	d	NR	NR	AD	F	C	Lab	MOR	MOR	SURV	WO	40.0		N	0.144	N	0.01648227	4.58		10	10	5	10	5	9	4	10	10	4	77
241	14917	DeWitt, 1955	DDT	DDT	100	Pheasant (*Phasianus colchicus*)	2	0/4.6	mg/kg bw/d	N	na	ADL	U	FD	120	d	1	d	JV	B	C	Lab	MOR	MOR	MORT	WO	4.60		N	1.3	N	0.0690399	4.60		10	10	5	10	10	9	4	1	10	4	73
242	14923	Locke et al, 1966	DDT	p,p' - DDT - Technical	100	Bald eagle (*Haliaeetus leucocephalus*)	3	0/160/4000	mg/kg diet	N	na	DLY	U	FD	23	d	NR	NR	NR	NR	V	Lab	MOR	MOR	MORT	WO	160	4000	N	5.3499999	N	0.17341286	5.19	130	10	10	5	10	5	9	6	10	6	4	75
243	3239	Davison et al 1976	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	4	0/2.5/10/40	mg/kg diet	N	na	ADL	U	FD	12	w	9	w	JV	F	V	Lab	MOR	MOR	MORT	WO	40.0		N	0.1	N	0.01299939	5.20		10	10	5	10	5	9	4	10	10	4	77
244	14919	Genelly and Rudd, 1955	DDT	DDT	100	Ring-necked pheasant (*Phasianus colchicus*)	3	0/5.72/20.84	mg/org/d	N	na	NR	U	FD	74	d	6	mo	JV	B	C	Lab	MOR	MOR	MORT	WO	5.72	20.8	N	0.95	Y	0.000057	6.02	21.9	10	10	5	10	6	9	8	10	10	4	82
245	3593	Simpson et al., 1972	DDT	o,p' - DDT	100	Turkey (*Meleagris gallopavo*)	2	0/264.6	mg/kg diet	N	na	ADL	U	FD	15	w	6	w	JV	M	C	Lab	MOR	MOR	MORT	WO	265		N	14.3	N	0.328887	6.09		10	10	5	10	5	9	4	10	10	4	77
246	3593	Simpson et al., 1972	DDT	p,p' - DDT	100	Turkey (*Meleagris gallopavo*)	2	0/264.6	mg/kg diet	N	na	ADL	U	FD	15	w	6	w	JV	M	C	Lab	MOR	MOR	MORT	WO	265		N	14.3	N	0.328887	6.09		10	10	5	10	5	9	4	10	10	4	77
247	71	Chang and Stokstad, 1975	DDE	DDE	100	Japanese quail (*Coturnix japonica*)	3	0/50/200	mg/kg diet	N	na	DLY	U	FD	14	w	2	w	JV	F	C	Lab	MOR	MOR	MORT	WO	50.0	200	Y	0.11	N	0.01383151	6.3	25.1	10	10	5	10	6	9	8	10	10	4	82
248	3399	Jefferies 1971	DDT	p,p' - DDT	100	Bengalese Finch (*Lonchura striata*)	4	0/34/139/1205	ug/org/d	N	na	DLY	U	FD	6	w	200-300	d	SM	B	C	Lab	MOR	MOR	MORT	WO	139	1205	Y	0.01413	N	0.00363635	9.84	85.3	10	10	5	10	6	9	8	10	10	4	82
249	14917	DeWitt, 1955	DDT	DDT	100	Quail (*Coturnix japonica*)	2	0/10.5	mg/kg bw/d	N	na	ADL	U	FD	120	d	1	d	JV	B	C	Lab	MOR	MOR	MORT	WO	10.5		N	0.1	N	0.01299939	10.5		10	10	5	10	10	9	4	1	10	4	73
250	14917	DeWitt, 1955	DDT	DDT	100	Quail (*Coturnix japonica*)	2	0/0.01	% in diet	N	na	ADL	U	FD	10	w	NR	NR	JV	NR	C	Lab	MOR	MOR	SURV	WO	0.010		Y	0.16	N	0.01765245	11.0		10	10	5	10	6	9	4	1	10	4	69
251	71	Chang and Stokstad, 1975	DDT	DDT	100	Japanese quail (*Coturnix japonica*)	3	0/25/100	mg/kg diet	N	na	DLY	U	FD	5	w	2	w	JV	F	C	Lab	MOR	MOR	MORT	WO	100		Y	0.1416	N	0.01630291	11.5		10	10	5	10	6	9	4	10	10	4	78
252	942	Davison and Sell, 1974	DDT	p,p' - DDT	99	Duck (*Anas platyrhynchos*)	5	0/2/20/40/200	mg/kg diet	N	na	ADL	U	FD	3	mo	1	yr	AD	F	V	Lab	MOR	MOR	SURV	WO	200		Y	0.93	N	0.05551437	11.8		10	10	5	10	6	9	4	6	6	4	70
253	3399	Jefferies 1971	DDE	p,p' - DDE	100	Bengalese Finch (*Lonchura striata*)	4	0/18/168/840	ug/org/d	N	na	DLY	U	FD	6	w	250	d	SM	B	C	Lab	MOR	MOR	MORT	WO		840	Y	0.01413	N	0.00363635	11.9	59.4	10	10	5	10	6	9	4	10	10	4	78
254	975	Gillett and Arscott, 1969	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	23	w	4	w	JV	M	V	Lab	MOR	MOR	MORT	WO	100		N	0.09	N	0.01213	13.5		10	10	5	10	5	9	4	10	10	4	77
255	77	Dieter 1974	DDE	DDE	100	Quail (*Coturnix japonica*)	4	0/5/25/100	mg/kg diet	N	na	DLY	U	FD	12	w	2	mo	SM	M	V	Lab	MOR	MOR	MORT	WO	100		N	0.09	N	0.01213766	13.5		10	10	5	10	5	9	4	10	10	4	77
256	3362	Kreitzer and Heinz, 1974	DDE	DDE	100	Quail (*Coturnix japonica*)	2	0/50	mg/kg diet	N	na	ADL	U	FD	8	d	0	d	JV	NR	C	Lab	MOR	MOR	MORT	WO	50.0		N	0.01200	N	0.003269	13.6		10	10	5	10	5	9	4	1	10	4	68
257	14917	DeWitt, 1955	DDT	DDT	100	Quail (*Coturnix japonica*)	3	0/13.8/25.0	mg/kg bw/d	N	na	ADL	U	FD	45	d	NR	NR	AD	B	C	Lab	MOR	MOR	MORT	WO	13.8	25.0	N	0.1	N	0.01299939	13.8	25.0	10	10	5	10	10	9	10	10	6	4	84
258	3575	Robson et al., 1976	DDE	DDE	100	Japanese quail (*Coturnix japonica*)	3	0/100/300	mg/kg diet	N	na	ADL	U	FD	168	d	1	d	JV	F	V	Lab	MOR	MOR	MORT	WO	100	300	Y	0.134	Y	0.019	14.2	43.5	10	10	5	10	7	9	10	10	10	4	85
259	3634	Van Velzen et al., 1972	DDT	p,p' - DDT	100	Cowbird (*Molothrus ater*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	13	d	NR	NR	NR	M	V	Lab	MOR	MOR	MORT	WO	100		N	0.049	N	0.00817035	16.7		10	10	5	10	5	9	4	10	6	4	73
260	71	Chang and Stokstad, 1975	DDT	DDT	100	Japanese quail (*Coturnix japonica*)	3	0/50/200	mg/kg diet	N	na	DLY	U	FD	5	w	2	w	JV	F	C	Lab	MOR	MOR	MORT	WO	200		Y	0.181	N	0.0191281	21.1		10	10	5	10	6	9	4	10	10	4	78
261	14919	Genelly and Rudd, 1955	DDT	DDT	100	Ring-necked pheasant (*Phasianus colchicus*)	6	0/50/100/200/400/600	mg/kg diet	N	na	NR	U	FD	90	d	6	mo	JV	F	C	Lab	MOR	MOR	MORT	WO	400	600	N	0.95	N	0.05628868	23.7	35.6	10	10	5	10	5	9	10	10	10	4	83
262	3595	Smith et al., 1969	DDT	p,p' - DDT	99	Japanese quail (*Coturnix japonica*)	4	0/100/200/400	mg/kg diet	N	na	ADL	U	FD	10	d	8	w	JV	B	C	Lab	MOR	MOR	MORT	WO	200	400	N	0.1	N	0.01299939	25.7	51.5	10	10	5	10	5	9	10	10	10	4	83
263	3438	Lehman et al., 1974	DDT	DDT - Technical	100	Bobwhite quail (*Colinus virginianus*)	4	0/10/50/150	mg/kg diet	N	na	ADL	U	FD	242	d	28	d	JV	B	C	FieldA	MOR	MOR	MORT	WO	250		N	0.04	N	0.00715919	26.8		10	10	5	10	5	9	4	10	10	4	77
264	3204	Britton, 1975	DDT	DDT - Technical	98	Chicken (*Gallus domesticus*)	4	0/300/600/1200	mg/kg diet	N	na	DLY	U	FD	84	d	19	mo	AD	F	C	Lab	MOR	MOR	MORT	WO	600	1200	N	1.6	N	0.07903238	29.0	58.1	10	10	5	10	5	9	10	10	6	4	79
265	3400	Jefferies and French, 1969	DDT	p,p' - DDT	100	Homing Pigeon (*Columba livia*)	4	0/9.1/18.2/36.1	mg/kg bw/d	N	na	DLY	U	OR	42	d	NR	NR	AD	B	V	Lab	MOR	MOR	MORT	WO	36.1		Y	0.3966	N	0.031875	36.1		10	8	10	10	10	9	4	10	6	4	81
266	3301	Friend and Trainer, 1974	DDT	p,p' - DDT	99	Mallard duck (*Anas platyrhynchos*)	5	0/500/1000/1500/2000	mg/kg diet	N	na	ADL	U	FD	10	d	5	d	JV	B	C	Lab	MOR	MOR	MORT	WO	500	1000	N	0.092	N	0.01231257	66.2	132	10	10	5	10	5	9	10	10	10	4	83
267	3763	DeWitt et al 1955	DDT	DDT	100	Starling (*Sturnus vulgaris*)	7	0/25/50/75/100/150/200	mg/kg bw/d	N	na	DLY	U	GV	5	d	NR	NR	JV	NR	V	NR	MOR	MOR	MORT	WO	100	200	N	0.0847	N	0.01166743	100	200	10	8	10	10	10	9	10	10	10	4	91
268	3442	Lillie et al., 1972	DDE	p,p' - DDE	100	Chicken (*Gallus domesticus*)	4	0/5/25/50	mg/kg diet	N	na	ADL	U	FD	28	w	26	w	SM	F	V	Lab	MOR	MOR	MORT	WO		5.0	Y	1.889	Y	0.111		0.293	10	10	5	10	7	9	4	10	10	4	79
269	3157	Dasadhikari, et al, 1996	DDD	o,p' - DDD	100	Pigeon (*Coumba livia*)	2	0/0.1	mg/org/d	N	na	DLY	U	OR	5	d	NR	NR	AD	NR	C	Lab	MOR	MOR	MORT	WO		0.100	N	0.34	N	0.02883472		0.294	10	8	10	10	5	9	4	10	3	4	73
270	3442	Lillie et al., 1972	DDT	o,p' - DDT	100	Chicken (*Gallus domesticus*)	4	0/5/25/50	mg/kg diet	N	na	ADL	U	FD	28	w	26	w	SM	F	V	Lab	MOR	MOR	MORT	WO		5.0	Y	1.84	Y	0.1095		0.298	10	10	5	10	7	9	4	10	10	4	79
271	3766	Chura and Stewart 1967	DDT	p,p' - DDT - Technical	100	Bald eagle (*Haliaeetus leucocephalus*)	5	0/10/160/800/4000	mg/kg diet	N	na	DLY	U	FD	77	d	NR	NR	JV	B	V	Lab	MOR	MOR	MORT	WO		10.0	Y	5.625	Y	0.401		0.713	10	10	5	10	7	9	4	10	10	4	79
272	3662	Wiemeyer et al, 1986	DDE	p,p' - DDE	100	American kestrel (*Falco sparverius*)	2	0/10	mg/kg diet	N	na	NR	U	FD	1	yr	NR	NR	AD	F	V	NR	MOR	MOR	MORT	WO		10.0	Y	0.161	N	0.0177242		1.10	10	10	5	10	6	9	4	10	10	4	78
273	14917	DeWitt, 1955	DDT	DDT	100	Pheasant (*Phasianus colchicus*)	2	0/11.5	mg/kg bw/d	N	na	ADL	U	FD	18	d	NR	NR	AD	B	C	Lab	MOR	MOR	MORT	WO		11.5	N	1.3	N	0.0690399		11.5	10	10	5	10	10	9	4	10	3	4	75
274	3575	Robson et al., 1976	DDT	p,p' - DDT	99	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	168	d	1	d	JV	M	V	Lab	MOR	MOR	MORT	WO		100	Y	0.110	Y	0.020		18.0	10	10	5	10	7	9	4	10	10	4	79
275	3583	Sell et al., 1972	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/200	mg/kg diet	N	na	ADL	U	FD	22	d	0	d	JV	B	C	Lab	MOR	MOR	MORT	WO		200	Y	0.0769	N	0.0109562		28.5	10	10	5	10	6	9	4	10	10	4	78
276	3301	Friend and Trainer, 1974	DDT	p,p' - DDT	99	Mallard duck (*Anas platyrhynchos*)	5	0/500/1000/1500/2000	mg/kg diet	N	na	ADL	U	FD	10	d	30	d	JV	B	C	Lab	MOR	MOR	MORT	WO		500	N	0.46	N	0.03510576		37.8	10	10	5	10	5	9	4	10	10	4	77
277	3301	Friend and Trainer, 1974	DDT	p,p' - DDT	99	Mallard duck (*Anas platyrhynchos*)	5	0/1000/1250/1500/2000	mg/kg diet	N	na	ADL	U	FD	10	d	NR	NR	AD	M	C	Lab	MOR	MOR	MORT	WO		1000	N	1.1	N	0.0619255		55.7	10	10	5	10	5	9	4	10	6	4	73
278	3726	Stickel et. al., 1966	DDT	p,p' - DDT	100	Cowbird (*Molothrus ater*)	2	0/500	mg/kg diet	N	na	NR	U	FD	8	d	NR	NR	NR	NR	V	Lab	MOR	MOR	MORT	WO		500	N	0.064	N	0.00972179		76.0	10	10	5	10	5	9	4	10	3	4	70
Data Not Used to Derive TRV																																														
279	3157	Dasadhikari, et al, 1996	DDD	o,p' - DDD	100	Pigeon (*Coumba livia*)	2	0/0.1	mg/org/d	N	na	DLY	U	OR	5	d	NR	NR	AD	NR	C	Lab	PTH	HIS	GHIS	AR	0.100		N	0.34	N	0.02883472	0.294		10	8	10	10	5	4	4	1	3	4	59
280	14923	Locke et al, 1966	DDT	p,p' - DDT - Technical	100	Bald Eagle (*Haliaeetus leucocephalus*)	2	0/10	mg/kg diet	N	na	DLY	U	FD	120	d	NR	NR	NR	NR	V	Lab	REP	REP	SPCL	TE	10.0		N	5.3499999	N	0.17341286	0.324		10	10	5	10	5	10	4	1	6	4	65
281	40	Davison and Sell, 1974	DDT	p,p' - DDT	99	Mallard duck (*Anas platyrhynchos*)	3	0/2/20/200	mg/kg diet	N	na	ADL	U	FD	343	d	2	yr	AD	F	C	Lab	BIO	ENZ	APND	LI	20.0		N	1.1	N	0.06192552	1.11		10	10	5	10	5	1	4	3	6	4	58
282	3570	Richie and Peterle, 1979	DDE	p,p' - DDE	99.9	Ringed turtle dove (*Streptopelia risoria*)	2	0/10	mg/kg diet	N	na	ADL	U	FD	90	d	NR	NR	SM	B	C	Lab	BIO	HRM	GHRM	BL	10.00		N	0.1440	N	0.01648	1.14		10	10	5	10	5	1	4	1	3	4	53
283	3615	Sullivan and Scanlon, 1991	DDT	p,p' - DDT	100	Northern bobwhite quail (*Colinus virginianus*)	2	0/25	mg/kg diet	N	na	ADL	U	FD	56	d	NR	NR	NR	F	V	Lab	BEH	FDB	FCNS	WO	25.0		Y	0.207	Y	0.0128	1.55		10	10	5	10	7	4	4	1	3	4	58
284	3615	Sullivan and Scanlon, 1991	DDT	p,p' - DDT	100	Northern bobwhite quail (*Colinus virginianus*)	2	0/25	mg/kg diet	N	na	ADL	U	FD	56	d	NR	NR	NR	F	V	Lab	GRO	GRO	BDWT	WO	25.0		Y	0.207	Y	0.0128	1.55		10	10	5	10	7	8	4	1	3	4	62
285	942	Davison and Sell, 1974	DDT	p,p' - DDT	99	Duck (*Anas platyrhynchos*)	4	0/2/20/200	mg/kg diet	N	na	ADL	U	FD	343	d	2	yr	AD	F	V	Lab	BEH	FDB	FCNS	WO	20		Y	1.12	Y	0.105	1.86		10	10	5	10	7	4	4	1	6	4	61
286	3217	Cecil et al., 1973	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	3	0/10/50	mg/kg diet	N	na	DLY	U	FD	28	w	2	yr	SM	F	C	NR	BIO	CHM	CALC	EG	50.0		N	1.6	N	0.07903238	2.47		10	10	5	10	5	1	4	1	10	4	60
287	3217	Cecil et al., 1973	DDT	DDT - Technical	100	Chicken (*Gallus domesticus*)	3	0/10/50	mg/kg diet	N	na	DLY	U	FD	28	w	2	yr	SM	F	C	NR	BIO	CHM	CALC	EG	50.0		N	1.6	N	0.07903238	2.47		10	10	5	10	5	1	4	1	10	4	60

Appendix 5.1 Avian Toxicity Data Extracted for Wildlife Toxiicty Reference Value (TRV)
DDT and Metabolites
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Ref				Exposure																				Effects						Conversion to mg/kg bw/day				Result		Data Evaluation Score											
Result #	Ref No.	Reference		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	General Effect Group	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
288	3440	Lillie et al., 1973	DDT	DDT - Pure isomers	100	Chicken (*Gallus domesticus*)	3	0/10/50	mg/kg diet	N	na	ADL	U	FD	40	w	26	w	SM	F	V	Lab	BEH	FDB	FCNS	WO	50.0		Y	2.121	Y	0.119	2.72		10	10	5	10	7	4	4	1	10	4	65
289	3440	Lillie et al., 1973	DDT	DDT - Technical	71	Chicken (*Gallus domesticus*)	3	0/10/50	mg/kg diet	N	na	ADL	U	FD	40	w	26	w	SM	F	C	Lab	BEH	FDB	FCNS	WO	50.0		Y	2.204	Y	0.120	1.99		10	10	5	10	7	4	4	1	10	4	65
290	3440	Lillie et al., 1973	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	2	0/50	mg/kg diet	N	na	ADL	U	FD	28	w	72	w	SM	F	V	Lab	BEH	FDB	FCNS	WO	50.0		Y	2.153	Y	0.118	2.74		10	10	5	10	7	4	4	1	10	4	65
291	3440	Lillie et al., 1973	DDT	DDT - Technical	100	Chicken (*Gallus domesticus*)	3	0/10/50	mg/kg diet	N	na	ADL	U	FD	40	w	26	w	SM	F	V	Lab	BEH	FDB	FCNS	WO	50.0		Y	2.078	Y	0.114	2.74		10	10	5	10	7	4	4	1	10	4	65
292	3442	Lillie et al., 1972	DDT	o,p' - DDT	100	Chicken (*Gallus domesticus*)	4	0/5/25/50	mg/kg diet	N	na	ADL	U	FD	28	w	26	w	SM	F	V	Lab	BEH	FDB	FCNS	WO	50.0		Y	1.893	Y	0.1133	2.99		10	10	5	10	7	4	4	1	10	4	65
293	3442	Lillie et al., 1972	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	4	0/5/25/50	mg/kg diet	N	na	ADL	U	FD	28	w	26	w	SM	F	V	Lab	BEH	FDB	FCNS	WO	50.0		Y	1.884	Y	0.1135	3.01		10	10	5	10	7	4	4	1	10	4	65
294	3442	Lillie et al., 1972	DDE	p,p' - DDE	100	Chicken (*Gallus domesticus*)	4	0/5/25/50	mg/kg diet	N	na	ADL	U	FD	28	w	26	w	SM	F	V	Lab	BEH	FDB	FCNS	WO	50.0		Y	1.790	Y	0.1084	3.03		10	10	5	10	7	4	4	1	10	4	64
295	3166	Arscott et al 1972	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	32	w	NR	NR	SM	M	V	Lab	BIO	CHM	PCLV	BL	100		Y	2.21	Y	0.068	3.08		10	10	5	10	7	1	4	3	3	4	57
296	3166	Arscott et al 1972	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	32	w	NR	NR	SM	M	V	Lab	BEH	FDB	FCNS	WO	100		Y	2.21	Y	0.068	3.08		10	10	5	10	7	4	4	6	3	4	63
297	14896	Mahoney 1975	DDE	p,p' - DDE	100	White Throated Sparrow (*Zonotrichia albicollis*)	3	0/5/25	mg/kg diet	N	na	ADL	U	FD	6	w	NR	NR	NR	NR	M	Lab	GRO	GRO	BDWT	WO	25.0		N	0.0259	N	0.00539487	5.21		10	10	5	10	5	8	4	1	6	4	63
298	3341	Haegele and Hudson 1977	DDE	p,p' - DDE	100	Ringed turtle dove (*Streptopelia risoria*)	3	0/10/50	mg/kg diet	N	na	ADL	U	FD	63	d	NR	NR	SM	M	C	Lab	PTH	GRS	BDWT	WO	50.0		N	0.152	N	0.01707274	5.62		10	10	5	10	5	4	4	3	6	4	61
299	3593	Simpson et al., 1972	DDT	o,p' - DDT	100	Turkey (*Meleagris gallopavo*)	2	0/264.6	mg/kg diet	N	na	ADL	U	FD	15	w	6	w	JV	M	C	Lab	PTH	HIS	GHIS	LI	265		N	14.3	N	0.328887	6.09		10	10	5	10	5	4	4	1	10	4	63
300	3593	Simpson et al., 1972	DDT	p,p' - DDT	100	Turkey (*Meleagris gallopavo*)	2	0/264.6	mg/kg diet	N	na	ADL	U	FD	15	w	6	w	JV	M	C	Lab	PTH	HIS	GHIS	LI	265		N	14.3	N	0.328887	6.09		10	10	5	10	5	4	4	1	10	4	63
301	942	Davison and Sell, 1974	DDT	DDT - Technical	90	Duck (*Anas platyrhynchos*)	4	0/2/20/200	mg/kg diet	N	na	ADL	U	FD	343	d	2	yr	AD	F	V	Lab	PTH	GRS	BDWT	WO	200		Y	1.48	Y	0.062	7.54		10	10	5	10	7	4	4	1	6	4	61
302	40	Davison and Sell, 1974	DDT	DDT - Technical	90	Mallard duck (*Anas platyrhynchos*)	4	0/2/20/200	mg/kg diet	N	na	ADL	U	FD	343	d	2	yr	AD	F	C	Lab	BIO	ENZ	APND	LI	200		N	1.1	N	0.06192552	10.1		10	10	5	10	5	1	4	1	10	4	60
303	942	Davison and Sell, 1974	DDT	p,p' - DDT	99	Duck (*Anas platyrhynchos*)	5	0/2/20/40/200	mg/kg diet	N	na	ADL	U	FD	3	mo	1	yr	AD	F	V	Lab	PTH	GRS	BDWT	WO	200		Y	0.93	N	0.05551437	11.8		10	10	5	10	6	4	4	1	6	4	60
304	3601	Stanley et al., 1978	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	31	d	4	w	JV	F	C	Lab	PTH	ORW	SMIX	LI	100		N	0.125	N	0.01503181	12.0		10	10	5	10	5	4	4	3	10	4	65
305	3601	Stanley et al., 1978	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	31	d	4	w	JV	F	C	Lab	BIO	ENZ	G6PD	LI	100		N	0.125	N	0.01503181	12.0		10	10	5	10	5	1	4	3	10	4	62
306	3591	Sifri et al., 1975	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/100	ug/g diet	N	na	ADL	U	FD	14	d	8	d	JV	B	C	Lab	BEH	BEH	INST	WO	100		N	0.100	N	0.02999	13.0		10	10	5	10	5	4	4	1	10	4	63
307	3591	Sifri et al., 1975	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/100	ug/g diet	N	na	ADL	U	FD	14	d	8	d	JV	B	C	Lab	BIO	CHM	MCPR	LI	100		N	0.100	N	0.02999	13.0		10	10	5	10	5	1	4	1	10	4	60
308	3591	Sifri et al., 1975	DDT	p,p' - DDT	100	Mallard duck (*Anas platyrhynchos*)	2	0/100	ug/g diet	N	na	ADL	U	FD	14	d	8	d	JV	B	C	Lab	PTH	ORW	SMIX	LI	100		N	0.092	N	0.01231	13.4		10	10	5	10	5	4	4	1	10	4	63
309	3362	Kreitzer and Heinz, 1974	DDE	DDE	100	Quail (*Coturnix japonica*)	2	0/50	mg/kg diet	N	na	ADL	U	FD	8	d	0	d	JV	NR	C	Lab	BEH	BEH	RSPT	WO	50.0		N	0.01200	N	0.003269	13.6		10	10	5	10	5	4	4	1	10	4	63
310	3591	Sifri et al., 1975	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	2	0/100	ug/g diet	N	na	ADL	U	FD	14	d	8	d	JV	B	C	Lab	PTH	ORW	SMIX	LI	100		N	0.084	N	0.0116	13.8		10	10	5	10	5	4	4	1	10	4	63
311	3575	Robson et al., 1976	DDT	p,p' - DDT	99	Japanese quail (*Coturnix japonica*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	168	d	1	d	JV	F	V	Lab	BEH	FDB	FCNS	WO	100		Y	0.121	Y	0.020	16.4		10	10	5	10	7	4	4	1	10	4	65
312	942	Davison and Sell, 1974	DDT	p,p' - DDT	99	Duck (*Anas platyrhynchos*)	4	0/2/20/200	mg/kg diet	N	na	ADL	U	FD	167	d	2	yr	AD	F	V	Lab	PTH	GRS	BDWT	WO	200		Y	1.12	Y	0.105	18.6		10	10	5	10	7	4	4	1	6	4	61
313	14919	Genelly and Rudd, 1955	DDT	DDT	100	Ring-necked pheasant (*Phasianus colchicus*)	3	0/5.72/20.84	mg/org/d	N	na	NR	U	FD	74	d	6	mo	JV	B	C	Lab	BEH	FDB	FCNS	WO	20.8		N	0.95	Y	5.21E-05	21.9		10	10	5	10	6	4	4	1	10	4	64
314	14920	Genelly and Rudd, 1956	DDT	DDT	100	Ring-necked pheasant (*Phasianus colchicus*)	3	0/5.72/20.84	mg/org/d	N	na	NR	U	FD	10	w	NR	NR	SM	F	C	Lab	BEH	FDB	FCNS	WO	20.8		N	0.95	Y	0.0521	21.9		10	10	5	10	6	4	4	1	10	4	64
315	3220	Cecil et al., 1978	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	4	0/5/50/500	mg/kg diet	N	na	ADL	U	FD	30	d	11	mo	SM	M	C	Lab	BIO	ENZ	AHDX	LI	500		Y	1.98	N	0.09079293	22.9		10	10	5	10	6	1	4	1	6	4	57
316	3615	Sullivan and Scanlon, 1991	DDT	p,p' - DDT	100	Northern bobwhite quail (*Colinus virginianus*)	2	0/25	mg/kg bw/d	N	na	DLY	U	GV	56	d	NR	NR	NR	F	V	Lab	BEH	FDB	FCNS	WO	25.0		Y	0.193	Y	0.0135	25.0		10	8	10	10	10	4	4	1	3	4	64
317	3583	Sell et al., 1972	DDT	p,p' - DDT	100	Japanese quail (*Coturnix japonica*)	2	0/200	mg/kg diet	N	na	ADL	U	FD	22	d	0	d	JV	B	C	Lab	PTH	ORW	ORWT	LI	200		Y	0.0769	N	0.0109562	28.5		10	10	5	10	6	4	4	1	10	4	64
318	3324	Grassle and Biessmann, 1982	DDT	DDT - Technical	100	Japanese quail (*Coturnix japonica*)	3	0/50/250	mg/kg diet	N	na	ADL	U	FD	70	d	5	w	JV	B	V	Lab	BIO	HRM	THYR	SR	250		N	0.1	N	0.01299939	32.5		10	10	5	10	5	1	4	3	10	4	62
319	3183	Biessmann and von Faber, 1981	DDT	DDT - Technical	100	Japanese quail (*Coturnix japonica*)	3	0/50/250	mg/kg diet	N	na	ADL	U	FD	9	w	5	w	JV	F	C	Lab	PTH	ORW	SMIX	AR	250		N	0.1	N	0.01299939	32.5		10	10	5	10	5	4	4	3	10	4	65
320	3324	Grassle and Biessmann, 1982	DDT	DDT - Technical	100	Japanese quail (*Coturnix japonica*)	3	0/50/250	mg/kg diet	N	na	ADL	U	FD	70	d	5	w	JV	B	V	Lab	PTH	ORW	ORWT	TY	250		N	0.1	N	0.01299939	32.5		10	10	5	10	5	4	4	3	10	4	65
321	3575	Robson et al., 1976	DDE	DDE	100	Japanese quail (*Coturnix japonica*)	3	0/100/300	mg/kg diet	N	na	ADL	U	FD	168	d	1	d	JV	F	V	Lab	BEH	FDB	FCNS	WO	300		Y	0.134	Y	0.019	42.5		10	10	5	10	7	4	4	1	10	4	65
322	3548	Pepperell, 1972	DDT	p,p' - DDT	100	Chicken (*Gallus domesticus*)	4	0/1.5/15/75	mg/org/d	N	na	ADL	U	FD	8	w	NR	NR	SM	F	C	Lab	MOR	MOR	MORT	WO	75.0		N	1.6	Y	0.07903238	46.9		10	10	5	10	6	9	4	1	6	4	65
323	3563	Ragland et al., 1971	DDT	p,p' - DDT	100	Duck (*Anas platyrhynchos*)	2	0/900	mg/kg diet	N	na	ADL	U	FD	8	d	NR	NR	JV	M	C	Lab	PTH	HIS	NCRO	LI	900		N	0.46	N	0.03628638	71.0		10	10	5	10	5	4	4	1	10	4	63
324	3157	Dasadhikari, et al, 1996	DDD	o,p' - DDD	100	Pigeon (*Coumba livia*)	2	0/0.1	mg/org/d	N	na	DLY	U	OR	5	d	NR	NR	AD	NR	C	Lab	BIO	HRM	CORT	AR		0.100	N	0.34	N	0.02883472		0.294	10	8	10	10	5	1	4	10	3	4	65
325	3356	Haseltine et al., 1974	DDE	p,p' - DDE	99.9	Mallard duck (*Anas platyrhynchos*)	2	0/10	mg/kg diet	N	na	ADL	U	FD	5	mo	NR	NR	AD	F	V	Lab	BIO	CHM	CALC	SR		10.0	N	1.1	N	0.06192552		0.562	10	10	5	10	5	1	4	10	3	4	62
326	3356	Haseltine et al., 1974	DDE	p,p' - DDE	99.9	Pheasant (*Phasianus colchicus*)	2	0/10	mg/kg diet	N	na	ADL	U	FD	11	w	NR	NR	AD	F	V	Lab	BIO	CHM	CALC	SR		10.0	N	0.95	N	0.05628868		0.592	10	10	5	10	5	1	4	10	3	4	62
215	3341	Haegele and Hudson 1977	DDE	p,p' - DDE	100	Ringed turtle dove (*Streptopelia risoria*)	3	0/10/50	mg/kg diet	N	na	ADL	U	FD	63	d	NR	NR	SM	M	C	Lab	BIO	CHM	LIPD	WO		10.0	N	0.152	N	0.01707274		1.12	10	10	5	10	5	1	4	10	6	4	65
216	3459	Lundholm, 1990	DDE	p,p' - DDE	100	Duck (*Anas platyrhynchos*)	2	0/40	mg/kg diet	N	na	ADL	U	FD	45	d	1	yr	AD	F	C	Lab	BIO	CHM	GBCM	SG		40.0	N	1.1	N	0.06192552		2.25	10	10	5	10	5	1	4	10	3	4	62
217	232	Kolaja and Hinton, 1979	DDT	DDT	100	Mallard duck (*Anas platyrhynchos*)	2	0/50	mg/kg diet	N	na	ADL	U	FD	6	mo	NR	NR	SM	B	C	Lab	BIO	CHM	CALC	SG		50.0	N	1.2	N	0.06553449		2.73	10	10	5	10	5	1	4	10	3	4	62
218	3428	Kolaja and Hinton, 1977	DDT	DDT	100	Mallard duck (*Anas platyrhynchos*)	2	0/50	mg/kg diet	N	na	ADL	U	FD	6	mo	NR	NR	AD	F	C	Lab	BIO	CHM	CALC	RT		50.0	N	1.1	N	0.06192552		2.81	10	10	5	10	5	1	4	10	3	4	62
219	3356	Haseltine et al., 1974	DDE	p,p' - DDE	99.9	Ringed turtle dove (*Streptopelia risoria*)	2	0/40	mg/kg diet	N	na	ADL	U	FD	3	w	NR	NR	AD	F	V	Lab	BIO	CHM	CALC	SR		40.0	N	0.144	N	0.01648227		4.57	10	10	5	10	5	1	4	10	3	4	62

All abbreviations and definitions are used in coding studies are available from Attachment 4-3 of the Eco-SSL *guidance* (U.S. EPA 2003).

*Duplicate values for NOAELs and LOAELs for the same reference represent results from different experimental designs and are identified by different Phase numbers.

Appendix 6-1

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

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April 2007

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Appendix 6.1 Mammalian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
DDT and Metabolites

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	78	General Effect Group	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	3470	Martin et al., 1976	p,p' - DDT	100	Rat (*Rattus norvegicus*)	5	0/0.45/0.72/1.24/1.62	mg/kg diet	N	na	ADL	UX	FD	120	d	NR	NR	JV	B	V	Lab	BIO	ENZ	GENZ	LI	1.62		Y	0.04	N	0.004874	0.197		10	10	10	10	6	1	4	1	10	4	66	
2	3380	Hoffman et al., 1970	DDT - Technical	88	Rat (*Rattus norvegicus*)	15	0/0.5/2/4/8/16/32/64/178/256/512/750/1024/1550/2048	mg/kg diet	N	na	ADL	U	FD	14	d	NR	NR	JV	M	C	Lab	BIO	ENZ	PNAD	LI	4.0	8.0	Y	0.12	N	0.012024	0.353	0.705	10	10	5	10	6	1	10	10	10	4	76	
4	3670	Wrenn et al., 1970	o,p' - DDT	100	Rat (*Rattus norvegicus*)	2	0/10/50	ug/org/d	N	na	DLY	U	GV	15	d	18	d	JV	F	V	Lab	BIO	CHM	GLYC	UT	50		Y	0.072	N	0.0079010	0.694		10	8	10	10	6	1	4	10	10	4	73	
5	3670	Wrenn et al., 1970	p,p' - DDT	100	Rat (*Rattus norvegicus*)	3	0/10/50	ug/org/d	N	na	DLY	U	GV	15	d	18	d	JV	F	V	Lab	BIO	CHM	GLYC	UT	50		Y	0.06830	N	0.075384	0.735		10	8	10	10	6	1	4	10	10	4	73	
6	3256	Dinu et al 1974	DDT - Technical	100	Rat (*Rattus norvegicus*)	2	0/20	mg/kg diet	N	na	DLY	U	FD	72	d	NR	NR	JV	F	C	Lab	BIO	ENZ	ALDO	LI	20		Y	0.1905	Y	0.01350	1.42		10	10	5	10	7	1	4	10	10	4	71	
7	3349	Cecil et al., 1971	o,p '- DDT	99	Rat (*Rattus norvegicus*)	6	0/50/100/250/500/1000	mg/kg diet	N	na	ADL	U	FD	7	d	22	d	JV	F	C	Lab	BIO	CHM	GLYC	UT	100	250	Y	0.0689	Y	0.00530	7.62	19.0	10	10	5	10	7	1	10	10	10	4	77	
8	1133	Thomas, 1974	DDT - Technical	100	Mouse (*Mus musculus*)	4	0/12.5/25/50	mg/kg bw/d	N	na	DLY	U	GV	10	d	NR	NR	AD	M	V	Lab	BIO	HRM	GHRM	PG	12.5	25	Y	0.04	N	0.0048736	12.5	25.0	10	8	10	10	10	1	10	10	6	4	79	
9	3209	Bunyan et al., 1972	p,p' - DDT	100	Rat (*Rattus norvegicus*)	2	0/150	mg/kg diet	N	na	ADL	U	FD	21	d	NR	NR	JV	M	C	Lab	BIO	CHM	MCPR	LI	150		Y	0.211	N	0.019121	13.6		10	10	5	10	6	1	4	6	10	4	66	
10	3811	Attia et al 1995	DDT	100	Rat (*Rattus norvegicus*)	2	0/22.6	mg/kg bw/d	N	na	DLY	U	GV	6	d	NR	mo	JV	M	V	Lab	BIO	CHM	PORP	HG	22.6		Y	0.125	N	0.012434	22.6		10	8	10	10	10	1	4	1	10	4	68	
11	3226	Clement and Okey 1972	o,p '- DDT	100	Rat (*Rattus norvegicus*)	5	0/500/1000/2000/3000	mg/kg diet	N	na	NR	U	FD	7	d	23	d	JV	F	M	Lab	BIO	CHM	GLYC	UT	500	1000	N	0.156	N	0.014918	47.8	95.6	10	10	5	10	5	1	10	10	10	4	75	
12	20970	Leavens et al, 2002	p,p' - DDE	99	Rat (*Rattus norvegicus*)	6	0/5/12.5/25/50/100	mg/kg bw/d	N	na	DLY	U	GV	5	d	71	d	JV	M	V	Lab	BIO	HRM	TSTR	SR	100		N	0.248	N	0.021837	99.0		10	8	10	10	10	1	4	1	10	7	71	
13	3630	Tinsley, 1965	p,p' - DDT	100	Rat (*Rattus norvegicus*)	4	0/5/25/200	mg/kg diet	N	na	ADL	U	FD	4	w	6	w	JV	B	V	Lab	BIO	ENZ	G6PD	LI		5.0	Y	0.100	N	0.010350		0.518	10	10	5	10	6	1	4	10	10	4	70	
14	3256	Dinu et al 1974	p,p' - DDT	100	Rat (*Rattus norvegicus*)	2	0/20	mg/kg diet	N	na	DLY	U	FD	72	d	4	w	JV	M	C	Lab	BIO	ENZ	GLRE	LI		20	Y	0.2602	Y	0.016500		1.27	10	10	5	10	7	1	4	10	10	4	71	
15	3256	Dinu et al 1974	DDT	100	Rat (*Rattus norvegicus*)	2	0/20	mg/kg diet	N	na	DLY	U	FD	72	d	NR	NR	JV	F	C	Lab	BIO	ENZ	ALDO	LI		20	Y	0.1859	Y	0.01390		1.50	10	10	5	10	7	1	4	10	10	4	71	
16	3171	Banerjee et al., 1983	DDT - Technical	100	Rat (*Rattus norvegicus*)	2	0/20	mg/kg diet	N	na	NR	U	FD	1	yr	NR	NR	JV	M	V	Lab	BIO	ENZ	ALPH	LI		20	Y	0.243	N	0.021475		1.77	10	10	5	10	6	1	4	10	10	4	70	
17	3320	Gillett, 1969	p,p' - DDT	100	Rat (*Rattus norvegicus*)	2	0/25	mg/kg diet	N	na	ADL	U	FD	2	w	28	d	JV	M	V	Lab	BIO	ENZ	GENZ	LI		25	N	0.217	N	0.019567		2.25	10	10	5	10	5	1	4	10	10	4	69	
18	3221	Cecil et al, 1975	DDT - Technical	90	Sheep (*Ovis aries*)	2	0/0.2	g/org/d	N	na	ADL	U	FD	17	w	1	yr	JV	F	C	Lab	BIO	ENZ	AHDX	LI		0.2	N	70	Y	1.10		2.57	10	10	5	10	6	1	4	10	10	4	70	
19	3209	Bunyan et al., 1972	p,p' - DDE	100	Rat (*Rattus norvegicus*)	4	0/50/100/150	mg/kg diet	N	na	ADL	U	FD	21	d	NR	NR	JV	M	C	Lab	BIO	CHM	MCPR	LI		50	Y	0.205	N	0.018673		4.55	10	10	5	10	6	1	4	10	10	4	70	
20	3630	Tinsley, 1965	p,p' - DDT	100	Rat (*Rattus norvegicus*)	3	0/50/100	mg/kg diet	N	na	ADL	U	FD	4	w	5-6	w	JV	B	C	Lab	BIO	ENZ	G6PD	LI		50	Y	0.100	N	0.012999		6.50	10	10	5	10	6	1	4	10	10	4	70	
21	3410	Jonsson et al., 1976	DDT - Technical	100	Rat (*Rattus norvegicus*)	3	0/75/150	mg/kg diet	N	na	ADL	U	FD	36	w	NR	NR	GE	F	C	Lab	BIO	HRM	PRGS	PL		75	Y	0.2500	N	0.021980		6.60	10	10	5	10	6	1	4	10	10	4	70	
22	3526	Orberg and Lundberg, 1974	p,p' - DDT	100	Mouse (*Mus musculus*)	2	0/0.25	mg/org/d	N	na	DLY	U	OR	28	d	NR	NR	SM	M	V	Lab	BIO	ENZ	P450	LI		0.25	N	0.0375	N	0.0046218		6.67	10	8	10	10	6	1	4	10	6	4	69	
23	3163	Ali and Shakoori, 1996	DDT	75	Rat (*Rattus norvegicus*)	2	0/10	mg/kg bw/d	N	na	ADL	U	FD	6	mo	3	mo	JV	NR	C	Lab	BIO	CHM	GLUC	LI		10	Y	0.21895	Y	0.0300		7.50	10	10	5	10	10	1	4	10	10	4	74	
24	3221	Cecil et al, 1975	DDT - Technical	90	Rat (*Rattus norvegicus*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	20	w	60-90	d	JV	F	C	Lab	BIO	ENZ	APND	LI		100	N	0.2024	N	0.018478		8.22	10	10	5	10	5	1	4	10	10	4	69	
25	3187	Cecil et al., 1973	p,p' - DDT	100	Rat (*Rattus norvegicus*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	2	mo	21	d	JV	B	C	Lab	BIO	CHM	LIPD	LI		100	Y	0.32	N	0.026927		8.41	10	10	5	10	6	1	4	10	10	4	70	
26	947	Deichmann, 1974	p,p' - DDT	99	Mouse (*Mus musculus*)	2	0/100	mg/kg diet	N	na	DLY	U	FD	260	d	4	w	GE	B	V	Lab	BIO	CHM	LIPD	LD		100	Y	0.0346	N	0.0043259		12.4	10	10	5	10	6	1	4	10	10	4	70	
27	3208	Bunyan and Page, 1973	p,p' - DDE	100	Rat (*Rattus norvegicus*)	2	0/150	mg/kg diet	N	na	ADL	U	FD	21	d	NR	NR	JV	M	C	Lab	BIO	CHM	PRTL	LI		150	Y	0.218	N	0.019641		13.5	10	10	5	10	6	1	4	10	10	4	70	
28	3208	Bunyan and Page, 1973	p,p' - DDMU	100	Rat (*Rattus norvegicus*)	2	0/150	mg/kg diet	N	na	ADL	U	FD	21	d	NR	NR	JV	M	C	Lab	BIO	ENZ	P450	LI		150	Y	0.216	N	0.019493		13.5	10	10	5	10	6	1	4	10	10	4	70	
29	3163	Ali and Shakoori, 1996	DDT	75	Rat (*Rattus norvegicus*)	2	0/20	mg/kg bw/d	N	na	ADL	U	FD	6	d	5	mo	JV	NR	C	Lab	BIO	CHM	GLUC	LI		20	Y	0.16647	Y	0.030		15.0	10	10	5	10	10	1	4	10	10	4	74	
30	3672	Yagi et. al., 1979	p,p' - DDT	100	Rat (*Rattus norvegicus*)	2	0/583	mg/kg diet	N	na	ADL	U	FD	50	d	NR	NR	JV	M	C	Lab	BIO	CHM	THIA	LI		583	Y	0.3918	N	0.03180		47.3	10	10	5	10	6	1	4	10	10	4	70	
31	3231	Copeland and Cranmer 1974	o,p' - DDT	100	Dog (*Canis familaris*)	2	0/50	mg/kg bw/d	N	na	DLY	U	OR	32	d	NR	NR	AD	M	V	FieldA	BIO	CHM	PRTL	LI		50	Y	14	N	0.60128		50.0	10	8	10	10	10	1	4	10	3	4	70	
32	3610	Story and Freedland, 1979	o,p '- DDT	100	Rat (*Rattus norvegicus*)	2	0/1000	mg/kg diet	N	na	ADL	U	FD	2	w	NR	NR	JV	M	C	Lab	BIO	ENZ	GENZ	LI		1000	Y	0.2125	N	0.019233		90.5	10	10	5	10	6	1	4	10	10	4	70	
33	3482	McIntosh and Topham, 1972	DDT	100	Rat (*Rattus norvegicus*)	2	0/0.1	% in diet	N	na	DLY	U	FD	14	d	NR	NR	JV	NR	C	Lab	BIO	ENZ	NCCR	LI		0.10	Y	0.17	N	0.016010		94.2	10	10	5	10	6	1	4	10	6	4	66	
34	3610	Story and Freedland, 1979	o,p' - DDT	100	Rat (*Rattus norvegicus*)	2	0/1000	mg/kg diet	N	na	ADL	U	FD	2	w	NR	NR	JV	M	C	Lab	BIO	CHM	THRE	LI		1000	Y	0.15	N	0.014445		96.3	10	10	5	10	6	1	4	10	10	4	70	
35	3555	Platt and Cockrill, 1969	DDT	100	Rat (*Rattus norvegicus*)	2	0/0.10	% in diet	Y	na	ADL	U	FD	14	d	NR	NR	JV	M	C	Lab	BIO	ENZ	NCCR	LI		0.10	Y	0.2	N	0.018298		96.3	10	10	5	10	6	1	4	10	10	4	70	
36	3674	You et al., 1999	p,p' - DDE	99	Rat (*Rattus norvegicus*)	2	0/100	mg/kg bw/d	N	na	DLY	U	GV	7	d	NR	NR	AD	M	V	Lab	BIO	ENZ	GENZ	LI		100	Y	0.330	N	0.027616		99.0	10	8	10	10	10	1	4	10	10	4	77	
37	3482	McIntosh and Topham, 1972	DDT	100	Mouse (*Mus musculus*)	2	0/100	mg/kg bw/d	N	na	DLY	U	GV	14	d	NR	NR	AD	NR	C	Lab	BIO	ENZ	NCCR	LI		100	Y	0.035	N	0.004367		100	10	8	10	10	10	1	4	10	6	4	73	
Behavior																																																
38	3256	Dinu et al 1974	p,p' - DDT	100	Rat (*Rattus norvegicus*)	2	0/20	mg/kg diet	N	na	DLY	U	FD	72	d	4	w	JV	M	C	Lab	BEH	FDB	FCNS	WO	20		Y	0.2602	Y	0.01650	1.27		10	10	5	10	7	4	4	10	10	4	74	
39	3256	Dinu et al 1974	DDT - Technical	100	Rat (*Rattus norvegicus*)	2	0/20	mg/kg diet	N	na	DLY	U	FD	72	d	NR	NR	JV	F	C	Lab	BEH	FDB	FCNS	WO	20		Y	0.1905	Y	0.01350	1.42		10	10	5	10	7	4	4	10	10	4	74	
40	3256	Dinu et al 1974	DDT	100	Rat (*Rattus norvegicus*)	2	0/20	mg/kg diet	N	na	DLY	U	FD	72	d	NR	NR	JV	F	C	Lab	BEH	FDB	FCNS	WO	20		Y	0.1859	Y	0.01390	1.50		10	10	5	10	7	4	4	10	10	4	74	
41	3510	Nickerson and Sniffen, 1973	DDT - Commercial	100	Rat (*Rattus norvegicus*)	2	0/2	mg/kg bw/d	N	na	DLY	U	FD	8	w	7	w	JV	F	C	Lab	BEH	FDB	FCNS	WO	2.0		N	0.204	N	0.01860	2.0		10	10	5	10	10	4	4	1	10	4	68	
42	3553	Peterle and Peterle, 1971	DDT - Technical	100	Mouse (*Mus musculus*)	2	0/7	mg/kg diet	N	na	ADL	U	FD	80	d	12	w	SM	M	V	Lab	BEH	BEH	GBHV	WO		7.0	N	0.0317	N	0.0040256		0.889	10	10	5	10	5	4	4	10	10	4	72	
43	3564	Rao et al., 1978	DDT - Technical	50	Rat (*Rattus norvegicus*)	3	0/2/6	mg/kg bw/d	N	na	DLY	U	OR	8	w	NR	NR	JV	M	C	Lab	BEH	BEH	INST	WO		2.0	Y	0.25	N	0.021982		1.0	10	8	5	10	10	4	4	10	10	4	75	
44	3538	Paulsen et al 1975	DDT - Technical	100	Rat (*Rattus norvegicus*)	3	0/50/100	mg/kg diet	N	na	DLY	U	FD	14	d	90-100	d	GE	F	V	Lab	BEH	BEH	GBEH	WO		50.0	Y	0.25000	Y	0.010		2.0	10	10	5	10	7	4	4	10	10	4	74	
45	1020	Kimbrough et al. 1971	DDT - Technical	100	Rat (*Rattus norvegicus*)	3	0/12.93/26.5	mg/kg bw/d	N	na	ADL	U	FD	8	w	3-4	mo	JV	M	C	Lab	BEH	BEH	INST	WO		12.9	Y	0.597	N	0.044958		12.9	10	10	5	10	10	4	4	10	10	4	77	
Physiology																																																
46	3256	Dinu et al 1974	p,p' - DDT	100	Rat (*Rattus norvegicus*)	2	0/20	mg/kg diet	N	na	DLY	U	FD	72	d	NR	NR	JV	M	C	Lab	PHY	PHY	FDCV	WO	20		Y	0.2602	N	0.01650	1.27		10	10	5	10	6	4	4	10	10	4	73	
47	3256	Dinu et al 1974	DDT - Technical	100	Rat (*Rattus norvegicus*)	2	0/20	mg/kg diet	N	na	DLY	U	FD	72	d	NR	NR	JV	F	C	Lab	PHY	PHY	FDCV	WO	20		Y	0.1905	Y	0.01350	1.42		10	10	5	10	7	4	4	10	10	4	74	
48	3256	Dinu et al 1974	DDT	100	Rat (*Rattus norvegicus*)	2	0/20	mg/kg diet	N	na	DLY	U	FD	72	d	NR	NR	JV	F	C	Lab	PHY	PHY	FDCV	WO	20		Y	0.1859	Y	0.01390	1.50		10	10	5	10	7	4	4	10	10	4	74	
49	3510	Nickerson and Sniffen, 1973	DDT - Commercial	100	Rat (*Rattus norvegicus*)	2	0/2	mg/kg bw/d	N	na	DLY	U	FD	8	w	7	w	JV	F	C	Lab	PHY	PHY	FDCV	WO	2.0		N	0.204	N	0.01860	2.0		10	10	5	10	10	4	4	1	10	4	68	
50	3202	Braham and Neal, 1974	DDT	100	Short tail shrew (*Blarina brevicauda*)	2	0/16.55	mg/kg diet	N	na	DLY	M	FD	1	w	NR	NR	M	C	Lab	PHY	PHY	META	WO		16.55	N	0.017	Y	0.0120		11.7	10	10	10	10	6	4	4	10	3	4	71	
51	14715	Laug and Fitzhugh, 1946	DDT - Commercial	100	Rat (*Rattus norvegicus*)	3	0/800/1200	mg/kg diet	N	na	DLY	U	FD	6	mo	21	d	JV	M	C	Lab	PHY	PHY	GPHY	LI		800	N	0.4702	N	0.036946		62.9	10	10	5	10	5	4	4	10	10	4	72	
Pathology																																																
52	3612	Street and Sharma, 1975	p,p' - DDT	100	Rabbit (*Oryctolagus cuniculus*)	5	0/0.184/0.92/2.10/6.54	mg/kg bw/d	N	na	ADL	U	FD	57	d	NR	NR	AD	M	V	Lab	PTH	HIS	GHIS	VI	0.184	0.92	Y	2.97	N	0.16808	0.184	0.92	10	10	5	10	10	4	8	10	6	4	77	
53	14960	Treon et al, 1951	DDT - Technical	92	Rat (*Rattus norvegicus*)	6	0/2.5/5.0/25/75/300	mg/kg diet	N	na	DLY	U	FD	16	w	NR	NR	JV	B	C	Lab	PTH	HIS	GHIS	LI	5.0	25.0	Y	0.39787	N	0.032207	0.372	1.86	10	10	5	10	6	4	8	10	10	4	77	
54	14960	Treon et al, 1951	p,p' - DDT	100	Rat (*Rattus norvegicus*)	6	0/2.5/5.0/25/75/300	mg/kg diet	N	na	DLY	U	FD	16	w	NR	NR	JV	B	C	Lab	PTH	HIS	GHIS	LI	5.0	25.0	Y	0.39787	N	0.032207	0.405	2.20	10	10	5	10	6	4	8	10	10	4	77	
55	3630	Tinsley, 1965	p,p' - DDT	100	Rat (*Rattus norvegicus*)	4	0/5/25/200	mg/kg diet	N	na	ADL	U	FD	4	w	6	w	JV	B	V	Lab	PTH	ORW	SMIX	LI	5.0	25	Y	0.100	N	0.010350	0.518	2.59	10	10	5	10	6	4	8	10	10	4	77	
56	3670	Wrenn et al., 1970	o,p' - DDT	100	Rat (*Rattus norvegicus*)	2	0/10/50	ug/org/d	N	na	DLY	U	GV	15	d	18	d	JV	F	V	Lab	PTH	ORW	ORWT	AR	50		Y	0.072	N	0.0079010	0.694		10	8	10	10	6	4	4	10	10	4	76	
57	3670	Wrenn et al., 1970	p,p' - DDT	100	Rat (*Rattus norvegicus*)	3	0/10/50	ug/org/d	N	na	DLY	U	GV	15	d	18	d	JV	F	V	Lab	PTH	ORW	ORWT	AR	50		Y	0.06830	N	0.075384	0.735		10	8	10	10	6	4	4	10	10	4	76	
58	3171	Banerjee et al., 1983	DDT - Technical	100	Rat (*Rattus norvegicus*)	2	0/20	mg/kg diet	N	na	NR	U	FD	1	yr	NR	NR	JV	M	V	Lab	PTH	ORW	SMIX	LI	20		Y	0.243	N	0.0214746	1.77		10	10	5	10	6	4	4	6	10	4	69	
59	3221	Cecil et al, 1975	DDT - Technical	90	Sheep (*Ovis aries*)	2	0/0.2	g/org/d	N	na	ADL	U	FD	17	w	1	yr	JV	F	C	Lab	PTH	ORW	ORWT	LI	0.2		N	70	Y	1.10	2.57		10	10	5	10	6	4	4	8	10	4	71	

Appendix 6.1 Mammalian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
DDT and Metabolites

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	78	General Effect Group	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
60	14719	Wilson et al., 1946	DDT	100	Cattle (*Bos taurus*)	2	0/1.60	g/kg bw/d	N	na	DLY	U	FD	141	d	NR	NR	AD	NR	C	NR	PTH	ITX	GITX	WO	1.60		Y	532	Y	18.0	3.53		10	10	5	10	10	4	4	10	3	4	70
61	3380	Hoffman et al., 1970	DDT - Technical	88	Rat (*Rattus norvegicus*)	15	0/0.5/2/4/8/16/32/64/178/256/512/750/1024/1550/2048	mg/kg diet	N	na	ADL	U	FD	14	d	NR	NR	JV	M	C	Lab	PTH	ORW	ORWT	LI	64.0	128	Y	0.12	N	0.012024	5.64	11.3	10	10	5	10	6	4	10	10	10	4	79
62	3431	Kornbrust et al, 1986	p,p' - DDE	99	Rat (*Rattus norvegicus*)	2	0/7.14	mg/kg bw/d	N	na	5 per w	U	GV	75	d	55	d	GE	F	V	Lab	PTH	ORW	SMIX	LI	7.14		Y	0.320	N	0.026920	7.07		10	8	10	10	10	4	4	10	10	4	80
63	3221	Cecil et al, 1975	DDT - Technical	90	Rat (*Rattus norvegicus*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	20	w	60-90	d	JV	F	C	Lab	PTH	ORW	ORWT	LI	100		N	0.2024	N	0.018478	8.22		10	10	5	10	5	4	4	8	10	4	70
64	3652	Wassermann et al,	p,p' - DDT	100	Rat (*Rattus norvegicus*)	2	0/100	mg/L	N	na	ADL	U	DR	6	w	NR	NR	JV	B	V	Lab	PTH	ORW	SMIX	AR	100		Y	0.138	N	0.016654	12.1		10	5	5	10	6	4	4	10	10	4	68
65	20970	Leavens et al, 2002	p,p' - DDE	99	Rat (*Rattus norvegicus*)	6	0/5/12.5/25/50/100	mg/kg bw/d	N	na	DLY	U	GV	5	d	71	d	JV	M	V	Lab	PTH	ORW	ORWT	LI	12.5	25	N	0.248	N	0.021837	12.4	24.8	10	8	10	10	10	4	10	10	7	89
66	3209	Bunyan et al., 1972	p,p' - DDE	100	Rat (*Rattus norvegicus*)	4	0/50/100/150	mg/kg diet	N	na	ADL	U	FD	21	d	NR	NR	JV	M	C	Lab	PTH	ORW	ORWT	LI	150		Y	0.206	N	0.018748	13.7		10	10	5	10	6	4	4	10	10	4	73
67	961	Foster, 1968	DDD	100	Rat (*Rattus norvegicus*)	3	0/100/200	mg/kg diet	N	na	NR	U	FD	42	d	NR	NR	JV	F	C	Lab	PTH	ORW	SMIX	AR	200		Y	0.258	N	0.022558	17.5		10	10	5	10	6	4	4	10	10	4	73
68	961	Foster, 1968	DDT - Technical	100	Rat (*Rattus norvegicus*)	3	0/100/200	mg/kg diet	N	na	NR	U	FD	42	d	NR	NR	JV	F	C	Lab	PTH	ORW	SMIX	AR	200		Y	0.247	N	0.021765	17.6		10	10	5	10	6	4	4	10	10	4	73
69	3172	Banerjee and Pasha, 1996	DDA	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg diet	N	na	ADL	U	FD	6	w	NR	NR	JV	M	C	Lab	PTH	ORW	SMIX	LI	200		Y	0.1345	N	0.013206	19.6		10	10	5	10	6	4	4	10	10	4	73
70	3527	Ortega et al, 1957	p,p' - DDT	100	Rat (*Rattus norvegicus*)	7	0/5/15/50/200/400/1000	mg/kg diet	N	na	ADL	U	FD	2	mo	NR	NR	JV	B	C	Lab	PTH	ORW	SMIX	LI	200	400	Y	0.1	N	0.010350	20.7	41.4	10	10	5	10	6	4	10	10	4	79
71	3651	Wasserman and Wasserman, 1973	p,p' - DDT	100	Rat (*Rattus norvegicus*)	2	0/200	mg/l	N	na	ADL	U	DR	6	w	1	mo	JV	M	V	Lab	PTH	HIS	GHIS	AR	200		Y	0.235	N	0.026890	22.9		10	5	5	10	6	4	4	10	10	4	68
72	73	Clark and Stafford, 1981	DDE	100	Little brown bat (*Myotis lucifugus*)	3	0.1/150/480	mg/kg diet	N	na	DLY	M	FD	8	d	NR	NR	AD	F	C	Lab	PTH	ITX	GITX	WO	150	480	Y	0.00633	N	0.0010708	25.4	81.2	10	10	10	10	6	4	8	10	6	4	78
73	3226	Clement and Okey 1972	o,p '- DDT	100	Rat (*Rattus norvegicus*)	5	0/500/1000/2000/3000	mg/kg diet	N	na	NR	U	FD	7	d	23	d	JV	F	M	Lab	PTH	ORW	ORWT	UT	500	1000	N	0.156	N	0.014918	47.8	95.6	10	10	5	10	5	4	10	10	4	78
74	1133	Thomas, 1974	DDT - Technical	100	Mouse (*Mus musculus*)	4	0/12.5/25/50	mg/kg bw/d	N	na	DLY	U	GV	10	d	NR	NR	AD	M	V	Lab	PTH	ORW	SMIX	PG	50		Y	0.04	N	0.0048736	50.0		10	8	10	10	10	4	4	3	6	4	69
75	3224	Chowdhury et al., 1990	DDT - Technical	100	Rat (*Rattus norvegicus*)	2	0/0.2	mg/kg bw/d	N	na	DLY	U	GV	120	d	NR	NR	JV	M	V	Lab	PTH	ORW	ORWT	AR		0.20	Y	0.3243	N	0.027224		0.20	10	8	10	10	4	4	10	10	4	80
76	3564	Rao et al., 1978	DDT - Technical	50	Rat (*Rattus norvegicus*)	3	0/2/6	mg/kg bw/d	N	na	DLY	U	OR	8	w	NR	NR	JV	M	C	Lab	PTH	ORW	SMIX	LI		2.0	N	0.25	N	0.021982		1.0	10	8	5	10	10	4	4	10	10	4	75
77	3630	Tinsley, 1965	p,p' - DDT	100	Rat (*Rattus norvegicus*)	3	0/50/100	mg/kg diet	N	na	ADL	U	FD	4	w	5-6	w	JV	B	C	Lab	PTH	ORW	SMIX	WO		50	Y	0.100	N	0.012999		6.50	10	10	5	10	6	4	4	10	10	4	73
78	3411	Jonsson et al., 1981	DDT - Technical	100	Rat (*Rattus norvegicus*)	3	0/75/150	mg/kg diet	N	na	ADL	U	FD	36	w	NR	NR	JV	F	C	Lab	PTH	HIS	NCRO	LI		75	Y	0.25	N	0.021982		6.59	10	10	5	10	6	4	4	10	10	4	73
79	3526	Orberg and Lundberg, 1974	p,p' - DDT	100	Mouse (*Mus musculus*)	2	0/0.25	mg/org/d	N	na	DLY	U	OR	28	d	NR	NR	SM	M	V	Lab	PTH	ORW	ORWT	LI		0.25	N	0.0375	N	0.0046218		6.67	10	8	10	10	6	4	4	10	6	4	72
80	3162	Ali and Shakoori, 1996	DDT	75	Rat (*Rattus norvegicus*)	2	0/10	mg/kg bw/d	N	na	ADL	U	FD	6	mo	3	mo	JV	NR	C	Lab	PTH	HIS	CTYP	LI		10	Y	0.21895	N	0.019712		7.50	10	10	5	10	10	4	4	10	10	4	77
81	3163	Ali and Shakoori, 1996	DDT	75	Rat (*Rattus norvegicus*)	2	0/10	mg/kg bw/d	N	na	ADL	U	FD	6	mo	3	mo	JV	NR	C	Lab	PTH	ORW	ORWT	LI		10	Y	0.21895	Y	0.030		7.50	10	10	5	10	10	4	4	10	10	4	77
82	3187	Cecil et al., 1973	p,p' - DDT	100	Rat (*Rattus norvegicus*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	2	mo	21	d	JV	M	C	Lab	PTH	ORW	ORWT	LI		100	Y	0.32	N	0.026927		8.41	10	10	5	10	6	4	4	10	10	4	73
83	14714	Fitzhugh and Nelson, 1947	DDT - Technical	100	Rat (*Rattus norvegicus*)	5	0/100/200/400/800	mg/kg diet	N	na	ADL	U	FD	24	mo	21	d	JV	M	V	Lab	PTH	HIS	GLSN	LI		100	N	0.55	N	0.042028		8.71	10	10	5	10	5	4	4	10	10	4	72
84	1020	Kimbrough et al. 1971	DDT - Technical	100	Rat (*Rattus norvegicus*)	3	0/12.93/26.5	mg/kg bw/d	N	na	ADL	U	FD	8	w	3-4	mo	JV	M	C	Lab	PTH	ORW	SMIX	LI		12.9	Y	0.597	N	0.044958		12.9	10	10	5	10	10	4	4	10	10	4	77
85	3208	Bunyan and Page, 1973	p,p' - DDMU	100	Rat (*Rattus norvegicus*)	2	0/150	mg/kg diet	N	na	ADL	U	FD	21	d	NR	NR	JV	M	C	Lab	PTH	ORW	SMIX	LI		150	Y	0.216	N	0.019493		13.5	10	10	5	10	6	4	4	10	10	4	73
86	3209	Bunyan et al., 1972	p,p' - DDT	100	Rat (*Rattus norvegicus*)	2	0/150	mg/kg diet	N	na	ADL	U	FD	21	d	NR	NR	JV	M	C	Lab	PTH	ORW	ORWT	LI		150	Y	0.211	N	0.019121		13.6	10	10	5	10	6	4	4	10	10	4	73
87	3208	Bunyan and Page, 1973	p,p' - DDE	100	Rat (*Rattus norvegicus*)	2	0/150	mg/kg diet	N	na	ADL	U	FD	21	d	NR	NR	JV	M	C	Lab	PTH	ORW	SMIX	LI		150	Y	0.218	N	0.021590		14.9	10	10	5	10	6	4	4	10	10	4	73
88	3162	Ali and Shakoori, 1996	DDT	75	Rat (*Rattus norvegicus*)	2	0/20	mg/kg bw/d	N	na	ADL	U	FD	6	d	5	mo	JV	NR	C	Lab	PTH	HIS	CTYP	LI		20	Y	0.16745	N	0.015812		15.0	10	10	5	10	10	4	4	10	10	4	77
89	3163	Ali and Shakoori, 1996	DDT	75	Rat (*Rattus norvegicus*)	2	0/20	mg/kg bw/d	N	na	ADL	U	FD	6	d	5	mo	JV	NR	C	Lab	PTH	ORW	ORWT	LI		20	Y	0.16647	Y	0.030		15.0	10	10	5	10	10	4	4	10	10	4	77
90	14714	Fitzhugh and Nelson, 1947	DDT - Technical	100	Rat (*Rattus norvegicus*)	5	0/200/400/600/800	mg/kg diet	N	na	ADL	U	FD	18	mo	21	d	JV	B	V	Lab	PTH	ORW	SMIX	LI		200	N	0.55	N	0.042028		15.3	10	10	5	10	5	4	4	10	10	4	72
91	3172	Banerjee and Pasha, 1996	p,p' - DDD	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg diet	N	na	ADL	U	FD	6	w	NR	NR	JV	M	C	Lab	PTH	ORW	SMIX	LI		200	Y	0.1427	N	0.013864		19.4	10	10	5	10	6	4	4	10	10	4	73
92	3172	Banerjee and Pasha, 1996	p,p' - DDT	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg diet	N	na	ADL	U	FD	6	w	NR	NR	JV	M	C	Lab	PTH	ORW	SMIX	LI		200	Y	0.142	N	0.013808		19.4	10	10	5	10	6	4	4	10	10	4	73
93	3172	Banerjee and Pasha, 1996	p,p' - DDE	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg diet	N	na	ADL	U	FD	6	w	NR	NR	JV	M	C	Lab	PTH	ORW	SMIX	LI		200	Y	0.13875	N	0.013548		19.5	10	10	5	10	6	4	4	10	10	4	73
94	3652	Wassermann et al,	p,p' - DDT	100	Rat (*Rattus norvegicus*)	2	0/200	mg/L	N	na	ADL	U	DR	5	w	NR	NR	JV	B	V	Lab	PTH	ORW	SMIX	LI		200	Y	0.19	N	0.022208		23.4	10	5	5	10	6	4	4	10	10	4	68
95	74	Clark and Kroll 1977	DDE	100	Free-tailed bat (*Tadarida brasiliensis*)	2	0/107	mg/kg diet	N	na	DLY	M	FD	40	d	NR	NR	AD	F	C	Lab	PTH	GRS	BDWT	WO		107	Y	0.00931	N	0.0027715		31.9	10	10	10	10	6	4	4	10	3	4	71
96	3286	Fonseca et al 1986	p,p' - DDT	98	Rat (*Rattus norvegicus*)	2	0/400	ug/g diet	N	na	ADL	U	FD	2	mo	NR	NR	JV	F	C	Lab	PTH	HIS	USTR	BR		400	Y	0.15	N	0.014445		37.2	10	10	5	10	6	4	4	10	10	4	73
97	3214	Cannon and Holcomb, 1968	DDT	100	Mouse (*Mus musculus*)	3	0/200/300	mg/kg diet	N	na	ADL	U	FD	55	d	4-5	mo	JV	M	C	Lab	PTH	ITX	GITX	WO		200	Y	0.0251	Y	0.0050		39.8	10	10	5	10	7	4	4	10	10	4	74
98	3672	Yagi et. al., 1979	p,p' - DDT	100	Rat (*Rattus norvegicus*)	2	0/583	mg/kg diet	N	na	ADL	U	FD	50	d	NR	NR	JV	M	C	Lab	PTH	ORW	ORWT	LI		583	Y	0.3918	N	0.031802		47.3	10	10	5	10	6	4	4	10	10	4	73
99	3231	Copeland and Cranmer 1974	o,p' - DDT	100	Dog (*Canis familaris*)	2	0/50	mg/kg bw/d	N	na	DLY	U	OR	32	d	NR	NR	AD	M	V	FieldA	PTH	ORW	ORWT	AR		50	Y	14	N	0.60128		50.0	10	8	10	10	10	4	4	10	3	4	73
100	14715	Laug and Fitzhugh, 1946	DDT - Commercial	100	Rat (*Rattus norvegicus*)	3	0/800/1200	mg/kg diet	N	na	DLY	U	FD	6	mo	21	d	JV	M	C	Lab	PTH	ORW	ORWT	LI		800	N	0.4702	N	0.036946		62.9	10	10	5	10	5	4	4	10	10	4	72
101	3482	McIntosh and Topham, 1972	DDT	100	Rat (*Rattus norvegicus*)	2	0/0.1	% in diet	N	na	DLY	U	FD	14	d	NR	NR	JV	NR	C	Lab	PTH	ORW	SMIX	LI		0.10	Y	0.17	N	0.016010		94.2	10	10	5	10	6	4	4	10	10	4	73
102	3555	Platt and Cockrill, 1969	DDT	100	Rat (*Rattus norvegicus*)	2	0/0.10	% in diet	N	na	ADL	U	FD	14	d	NR	NR	JV	M	C	Lab	PTH	ORW	SMIX	LI		0.1	Y	0.2	N	0.018298		96.3	10	10	5	10	6	4	4	10	10	4	73
103	3674	You et al., 1999	p,p' - DDE	99	Rat (*Rattus norvegicus*)	2	0/100	mg/kg bw/d	N	na	DLY	U	GV	7	d	NR	NR	AD	M	V	Lab	PTH	ORW	ORWT	LI		100	Y	0.330	N	0.027616		99.0	10	8	10	10	10	4	4	10	10	4	80
104	3482	McIntosh and Topham, 1972	DDT	100	Mouse (*Mus musculus*)	2	0/100	mg/kg bw/d	N	na	DLY	U	GV	14	d	NR	NR	AD	NR	C	Lab	PTH	ORW	SMIX	LI		100	Y	0.04	N	0.0048736		100	10	8	10	10	10	4	4	10	6	4	76
Reproduction																																															
105	3670	Wrenn et al., 1970	o,p' - DDT	100	Rat (*Rattus norvegicus*)	3	0/1/2.5	mg/kg diet	N	na	ADL	U	FD	168	d	1	d	JV	B	V	Lab	REP	REP	ORWT	OV	1.0	2.5	Y	0.072	N	0.0079010	0.110	0.274	10	10	5	10	6	10	10	10	10	4	85
106	3670	Wrenn et al., 1970	o,p' - DDT	100	Rat (*Rattus norvegicus*)	2	0/10/50	ug/org/d	N	na	DLY	U	GV	15	d	18	d	JV	F	V	Lab	REP	REP	GREP	WO	10	50	Y	0.072	N	0.0079010	0.139	0.694	10	8	10	10	6	10	8	10	10	4	86
107	3670	Wrenn et al., 1970	p,p' - DDT	100	Rat (*Rattus norvegicus*)	3	0/10/50	ug/org/d	N	na	DLY	U	GV	15	d	18	d	JV	F	V	Lab	REP	REP	GREP	WO	10	50	Y	0.06830	N	0.075384	0.147	0.735	10	8	10	10	6	10	8	10	10	4	86
108	3669	Wrenn et al., 1971	o,p '- DDT	100	Sheep (*Ovis aries*)	2	0/10	mg/kg diet	N	na	ADL	U	FD	9	mo	18-19	mo	GE	F	C	Lab	REP	REP	GREP	WO	10		N	32	N	1.1863	0.371		10	10	5	10	5	10	4	6	10	4	74
109	3649	Ware and Good, 1967	DDT - Technical	77.2	Mouse (*Mus musculus*)	2	0/7	mg/kg diet	N	na	ADL	U	FD	120	d	6	w	GE	B	V	Lab	REP	REP	FERT	WO	7.0		N	0.02223	N	0.0030148	0.731		10	10	5	10	5	10	4	10	10	4	78
110	3668	Wrenn et al., 1971	o,p '- DDT	100	Rat (*Rattus norvegicus*)	5	0/1/10/20/40	mg/kg diet	N	na	ADL	U	FD	17	w	21	d	GE	F	C	Lab	REP	REP	GREP	WO	10	20	Y	0.228	N	0.020379	0.894	1.79	10	10	5	10	6	10	10	10	10	4	85
111	3582	Seiler et al, 1994	DDT - Technical	100	Rabbit (*Oryctolagus cuniculus*)	2	0/1.3	mg/kg bw/d	N	na	3 per w	U	GV	116	d	NR	NR	GE	F	V	Lab	REP	REP	PROG	WO	1.3		Y	4.5	N	0.23654	1.30		10	8	10	10	10	10	4	1	10	4	77
112	3530	Ottoboni, 1972	DDT - Technical	99	Rat (Rattus norvegicus)	2	0/20	mg/kg diet	N	na	ADL	U	FD	23	mo	21	d	GE	F	C	Lab	REP	REP	PROG	WO	20		Y	0.338	N	0.028166	1.65		10	10	5	10	6	10	4	1	10	4	70
113	3227	Clement and Okey 1974	p,p' - DDT	100	Rat (*Rattus norvegicus*)	4	0/20/200/500	mg/kg diet	N	na	DLY	U	FD	8	mo	80-100	d	GE	F	V	Lab	REP	REP	PRWT	WO	20	200	N	0.297	N	0.025326	1.71	17.1	10	10	5	10	5	10	8	10	10	4	82
114	14965	Treon et al, 1954	DDT	100	Rat (*Rattus norvegicus*)	4	0/2.5/12.5/25.0	mg/kg diet	N	na	DLY	U	FD	120	d	28	d	GE	F	C	Lab	REP	REP	FERT	WO	25		N	0.2024	N	0.018478	2.28		10	10	5	10	5	10	4	1	10	4	69
115	3666	Wolfe et al., 1979	DDT	100	Field mouse (*Peromyscus polionotus*)	3	0/0.24/2.4	mg/kg bw/d	N	na	ADL	U	FD	15	mo	60	d	JV	B	V	Lab	REP	REP	PROG	WO	2.4		Y	0.0151	Y	0.0020	2.40		10	10	5	10	10	10	4	1	10	4	74
116	3221	Cecil et al, 1975	DDT - Technical	90	Sheep (*Ovis aries*)	2	0/0.2	g/org/d	N	na	ADL	U	FD	17	w	1	yr	JV	F	C	Lab	REP	REP	GREP	UT	0.2		N	70	Y	1.10	2.57		10	10	5	10	6	10	4	6	10	4	75
117	3437	Ledoux et al., 1977	DDT - Technical	98.5	Mouse (*Mus musculus*)	5	0/5/10/20/40	mg/kg diet	N	na	ADL	U	FD	84	d	7	w	GE	F	V	Lab	REP	REP	PRWT	WO	40.0		N	0.02875	N	0.0037150	5.09		10	10	5	10	5	10	4	10	10	4	78
118	3526	Orberg and Lundberg, 1974	p,p' - DDT	100	Mouse (*Mus musculus*)	2	0/0.25	mg/org/d	N	na	DLY	U	OR	28	d	NR	NR	SM	M	V	Lab	REP	REP	TEWT	TE	0.25		N	0.0375	N	0.0046218	6.67		10	8	10	10	6	10	4	10	6	4	78
119	3431	Kornbrust et al, 1986	p,p' - DDE	99	Rat (*Rattus norvegicus*)	2	0/7.14	mg/kg bw/d	N	na	5 per w	U	GV	75	d	55	d	GE	F	V	Lab	REP	REP	GSTT	WO	7.14		Y	0.320	N	0.026920	7.07		10	8	10	10	10	10	4	4	10	10	4	86
120	3349	Cecil et al., 1971	o,p '- DDT	99	Rat (*Rattus norvegicus*)	6	0/50/100/250/500/1000	mg/kg diet	N	na	ADL	U	FD	7	d	22	d	JV	F	C	Lab	REP	REP	GREP	UT	100	250	Y	0.0689	Y	0.00530	7.62	19.0	10	10	5	10	7	10	10	10	10	4	86

Appendix 6.1 Mammalian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
DDT and Metabolites
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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	78	General Effect Group	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
121	3674	You et al., 1999	p,p' - DDE	99	Rat (*Rattus norvegicus*)	3	0/10/100	mg/kg bw/d	N	na	DLY	U	GV	5	d	NR	NR	GE	F	V	Lab	REP	REP	OTHR	PY	10	100	N	0.350	N	0.027616	9.90	99.0	10	8	10	10	10	10	8	10	10	4	90
122	3448	Loeffler and Peterson, 1999	p,p' - DDE	100	Rat (*Rattus norvegicus*)	6	0/1/10/50/100/200	mg/kg bw/d	N	na	DLY	U	GV	5	d	NR	NR	GE	F	V	Lab	REP	REP	ODVP	WO	10	50	N	0.4	N	0.032348	10.0	50.0	10	8	10	10	10	10	8	10	10	4	90
123	947	Deichmann, 1974	p,p' - DDT	99	Mouse (*Mus musculus*)	2	0/100	mg/kg diet	N	na	DLY	U	FD	260	d	4	w	GE	B	V	Lab	REP	REP	PRWT	WO	100		Y	0.0346	N	0.0043259	12.4		10	10	5	10	6	10	4	10	10	4	79
124	3227	Clement and Okey 1974	o,p' - DDT	100	Rat (*Rattus norvegicus*)	4	0/20/200/1000	mg/kg diet	N	na	DLY	U	FD	8	mo	80-100	d	GE	F	V	Lab	REP	REP	PRWT	WO	200	1000	N	0.297	N	0.025326	17.1	85.3	10	10	5	10	5	10	8	10	10	4	82
125	3529	Ottoboni, 1969	DDT - Technical	99	Rat (*Rattus norvegicus*)	3	0/20/200	mg/kg diet	N	na	ADL	UX	FD	117	d	21	d	GE	B	C	Lab	REP	REP	RSUC	WO	200		N	0.267	N	0.023260	17.2		10	10	10	10	5	10	4	1	10	4	74
126	3802	Bernard and Gaertner, 1964	DDT - Technical	100	Mouse (*Mus musculus*)	5	0/100/200/300/600	mg/kg diet	N	na	ADL	U	FD	50	d	4	mo	GE	F	C	Lab	REP	REP	RSUC	WO	200	300	N	0.02875	N	0.0037150	25.8	38.8	10	10	5	10	5	10	10	10	10	4	84
127	3865	Hayes, 1976	DDT - Technical	99.5	Rat (*Rattus norvegicus*)	2	0/32.4	mg/kg bw/d	N	na	DLY	U	FD	116	d	21	d	GE	F	C	Lab	REP	REP	DEYO	WO	32.4		N	0.2024	Y	0.0000133	32.2		10	10	5	10	10	10	4	1	10	4	74
128	3226	Clement and Okey 1972	o,p '- DDT	100	Rat (*Rattus norvegicus*)	5	0/500/1000/2000/3000	mg/kg diet	N	na	NR	U	FD	7	d	23	d	JV	F	M	Lab	REP	REP	PVOP	WO	500	1000	N	0.156	N	0.014918	47.8	95.6	10	10	5	10	5	10	10	10	10	4	84
129	1133	Thomas, 1974	DDT - Technical	100	Mouse (*Mus musculus*)	4	0/12.5/25/50	mg/kg bw/d	N	na	DLY	U	GV	10	d	NR	NR	AD	M	V	Lab	REP	REP	TEWT	TE	50		Y	0.04	N	0.0048736	50.0		10	8	10	10	10	10	4	6	6	4	78
130	3214	Cannon and Holcomb, 1968	DDT	100	Mouse (*Mus musculus*)	3	0/200/300	mg/kg diet	N	na	ADL	U	FD	55	d	4-5	mo	JV	M	C	Lab	REP	REP	TEWT	TE	300		Y	0.0247	Y	0.0050	60.7		10	10	5	10	7	10	4	1	10	4	71
131	20970	Leavens et al, 2002	p,p' - DDE	99	Rat (*Rattus norvegicus*)	6	0/5/12.5/25/50/100	mg/kg bw/d	N	na	DLY	U	GV	5	d	71	d	JV	M	V	Lab	REP	REP	RHIS	PG	100		N	0.248	N	0.021837	99.0		10	8	10	10	10	10	4	1	10	7	80
132	3533	Palanza et al., 1999	o,p '- DDT	100	Mouse (*Mus musculus*)	6	0/20/200/2000/20000/100000	ug/kg bw/d	N	na	DLY	U	FD	7	d	NR	NR	GE	F	C	Lab	REP	REP	PBEH	WO	100000		Y	0.029	N	0.0037415	100		10	10	5	10	10	10	4	1	10	4	74
133	3496	Naishtein and Leibovich, 1970	DDT - Commercial	100	Rat (*Rattus norvegicus*)	2	0/0.02	mg/kg bw/d	N	na	NR	U	GV	4	mo	NR	NR	SM	F	V	Lab	REP	REP	GREP	WO		0.02	N	0.3846	N	0.031321		0.020	10	8	10	10	10	10	4	10	4	86
134	3533	Palanza et al., 1999	o,p '- DDT	100	Mouse (*Mus musculus*)	3	0/20/200	ug/kg bw/d	N	na	DLY	U	FD	7	d	NR	NR	GE	F	C	Lab	REP	REP	PBEH	WO		20	Y	0.029	N	0.0037415		0.020	10	10	5	10	10	10	4	10	10	4	83
135	3437	Ledoux et al., 1977	DDT - Technical	98.5	Mouse (*Mus musculus*)	4	0/5/10/20	mg/kg diet	N	na	ADL	U	FD	15	d	7	w	GE	B	V	Lab	REP	REP	PRWT	WO		5.0	N	0.02875	N	0.0037150		0.636	10	10	5	10	5	10	4	10	10	4	78
136	3621	Tarjan and Kemeny, 1969	p,p' - DDT	100	Mouse (*Mus musculus*)	2	0/0.7	mg/kg bw/d	N	na	ADL	UX	FD	6	mo	NR	NR	GE	F	C	Lab	REP	REP	PRWT	WO		0.7	N	0.0325	N	0.0041089		0.700	10	10	10	10	10	10	4	10	4	88
137	3649	Ware and Good, 1967	DDT - Technical	77.2	Mouse (*Mus musculus*)	2	0/7	mg/kg diet	N	na	ADL	U	FD	120	d	NR	NR	GE	B	V	Lab	REP	REP	FERT	WO		7.0	N	0.02223	N	0.0030148		0.731	10	10	5	10	5	10	4	10	10	4	78
138	3564	Rao et al., 1978	DDT - Technical	50	Rat (*Rattus norvegicus*)	3	0/2/6	mg/kg bw/d	N	na	DLY	U	OR	8	w	NR	NR	JV	M	C	Lab	REP	REP	TEWT	TE		2.0	Y	0.25	N	0.021982		1.0	10	8	5	10	10	10	4	10	10	4	81
139	3538	Paulsen et al 1975	DDT - Technical	100	Rat (*Rattus norvegicus*)	3	0/50/100	mg/kg diet	N	na	DLY	U	FD	14	d	90-100	d	GE	F	V	Lab	REP	REP	RBEH	WO		50.0	Y	0.25000	Y	0.010		2.0	10	10	5	10	7	10	4	10	10	4	80
140	3510	Nickerson and Sniffen, 1973	DDT - Commercial	100	Rat (*Rattus norvegicus*)	2	0/2	mg/kg bw/d	N	na	DLY	U	FD	8	w	7	w	JV	F	C	Lab	REP	REP	FERT	WO		2.0	N	0.204	N	0.018598		2.0	10	10	5	10	10	10	4	10	10	4	83
141	3447	Lindenau et al, 1994	DDT - Technical	100	Rabbit (*Oryctolagus cuniculus*)	2	0/3	mg/kg bw/d	N	na	3 per w	U	GV	12	w	NR	NR	SM	F	V	Lab	REP	REP	OVRT	WO		3.0	Y	4.5	N	0.23654		3.0	10	8	10	10	10	10	4	10	3	4	79
142	3437	Ledoux et al., 1977	DDT - Technical	98.5	Mouse (*Mus musculus*)	4	0/30/60/120	mg/kg bw/d	N	na	ADL	U	FD	15	d	7	w	GE	B	V	Lab	REP	REP	PROG	WO		30.0	N	0.02875	N	0.003715		3.82	10	10	5	10	5	10	4	10	10	4	78
143	14719	Wilson et al., 1946	DDT	100	Sheep (*Ovis aries*)	2	0/106	mg/kg diet	N	na	DLY	U	FD	175	d	NR	NR	GE	F	C	NR	REP	REP	PRWT	WO		106	Y	68.56	Y	2.730		4.22	10	10	5	10	7	10	4	10	10	4	80
144	3410	Jonsson et al., 1976	DDT - Technical	100	Rat (*Rattus norvegicus*)	3	0/75/150	mg/kg diet	N	na	ADL	U	FD	36	w	NR	NR	GE	F	C	Lab	REP	REP	PROG	WO		75	Y	0.2500	N	0.021980		6.60	10	10	5	10	6	10	4	10	10	4	79
145	3531	Ottoboni et al 1977	DDT - Technical	99	Dog (*Canis familiaris*)	4	0/2/5/10	mg/kg bw/d	N	na	DLY	U	OR	3	lf	NR	NR	GE	B	C	Lab	REP	REP	FERT	WO		10	Y	10.45	N	0.47279		9.90	10	8	10	10	10	10	4	10	10	4	86
146	14714	Fitzhugh and Nelson, 1947	DDT - Technical	100	Rat (*Rattus norvegicus*)	5	0/200/400/600/800	mg/kg diet	N	na	ADL	U	FD	89	w	21	d	JV	F	V	Lab	REP	REP	ABNM	OV		200	N	0.4	N	0.032348		16.2	10	10	5	10	5	10	4	10	10	4	78
147	3233	Craig and Ogilvie, 1974	DDT - Technical	100	Mouse (*Mus musculus*)	2	0/200	ug/g diet	N	na	NR	U	FD	6	w	NR	NR	GE	F	C	Lab	REP	REP	PROG	NR		200	N	0.0325	N	0.0041089		25.3	10	10	5	10	5	10	4	10	10	4	78
148	3433	Krause et al., 1975	DDT	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg bw/d	N	na	DLY	U	GV	14	d	4	d	JV	M	V	Lab	REP	REP	TEWT	TE		200	Y	0.032	N	0.0040569		200	10	8	10	10	10	10	4	10	10	4	86
Growth																																																
149	3670	Wrenn et al., 1970	o,p' - DDT	100	Rat (*Rattus norvegicus*)	2	0/10/50	ug/org/d	N	na	DLY	U	GV	15	d	18	d	JV	B	V	Lab	GRO	GRO	BDWT	WO	50		Y	0.072	N	0.0079010	0.694		10	8	10	10	6	8	4	10	10	4	80
150	3670	Wrenn et al., 1970	p,p' - DDT	100	Rat (*Rattus norvegicus*)	3	0/10/50	ug/org/d	N	na	DLY	U	GV	15	d	18	d	JV	F	V	Lab	GRO	GRO	BDWT	WO	50		Y	0.06830	N	0.075384	0.735		10	8	10	10	6	8	4	10	10	4	80
151	3256	Dinu et al 1974	p,p' - DDT	100	Rat (*Rattus norvegicus*)	2	0/20	mg/kg diet	N	na	DLY	U	FD	72	d	4	w	JV	M	C	Lab	GRO	GRO	BDWT	WO	20		Y	0.2602	Y	0.01650	1.27		10	10	5	10	7	8	4	10	10	4	78
152	3256	Dinu et al 1974	DDT - Technical	100	Rat (*Rattus norvegicus*)	2	0/20	mg/kg diet	N	na	DLY	U	FD	72	d	NR	NR	JV	F	C	Lab	GRO	GRO	BDWT	WO	20		Y	0.1905	Y	0.01350	1.42		10	10	5	10	7	8	4	10	10	4	78
153	14719	Wilson et al., 1946	DDT	100	Rat (*Rattus norvegicus*)	2	0/15	mg/L	N	na	DLY	U	FD	6	w	NR	NR	JV	B	C	NR	GRO	GRO	BDWT	WO	15.0	44.0	Y	0.160	N	0.015232	1.43	4.19	10	10	5	10	6	8	10	10	10	4	83
154	3256	Dinu et al 1974	DDT	100	Rat (*Rattus norvegicus*)	2	0/20	mg/kg diet	N	na	DLY	U	FD	72	d	NR	NR	JV	F	C	Lab	GRO	GRO	BDWT	WO	20		Y	0.1859	Y	0.01390	1.50		10	10	5	10	7	8	4	10	10	4	78
155	3171	Banerjee et al., 1983	DDT - Technical	100	Rat (*Rattus norvegicus*)	2	0/20	mg/kg diet	N	na	NR	U	FD	1	yr	NR	NR	JV	M	V	Lab	GRO	GRO	BDWT	WO	20		Y	0.243	N	0.021475	1.77		10	10	5	10	6	8	4	10	10	4	77
156	3510	Nickerson and Sniffen, 1973	DDT - Commercial	100	Rat (*Rattus norvegicus*)	2	0/2	mg/kg bw/d	N	na	DLY	U	FD	5	w	7	w	JV	F	C	Lab	GRO	GRO	BDWT	WO	2.0		N	0.204	N	0.018598	2.00		10	10	5	10	10	8	4	1	10	4	72
157	14964	Treon et al , 1953	p,p' - DDT	99.7	Rat (*Rattus norvegicus*)	4	0/2.5/12.5/25.0	mg/kg diet	N	na	DLY	U	FD	28	w	27	d	JV	B	C	Lab	GRO	GRO	BDWT	WO	25		Y	0.3738	N	0.030596	2.04		10	10	5	10	10	6	8	4	1	10	4	68
158	3612	Street and Sharma, 1975	p,p' - DDT	100	Rabbit (*Oryctolagus cuniculus*)	5	0/0.184/0.92/2.10/6.54	mg/kg bw/d	N	na	ADL	U	FD	57	d	NR	NR	AD	M	V	Lab	GRO	GRO	BDWT	WO	6.54		Y	3.07	N	0.17274	6.54		10	10	5	10	10	8	4	1	6	4	68
159	3431	Kornbrust et al, 1986	p,p' - DDE	99	Rat (*Rattus norvegicus*)	2	0/7.14	mg/kg bw/d	N	na	5 per w	U	GV	75	d	55	d	GE	F	V	Lab	GRO	GRO	BDWT	WO	7.14		Y	0.320	N	0.026920	7.07		10	8	10	10	10	8	4	10	10	4	84
160	947	Deichmann, 1974	p,p' - DDT	99	Mouse (*Mus musculus*)	2	0/100	mg/kg diet	N	na	DLY	U	FD	260	d	4	w	GE	B	V	Lab	GRO	GRO	BDWT	WO	100		Y	0.0346	N	0.0043259	12.4		10	10	5	10	6	8	4	10	10	4	77
161	3208	Bunyan and Page, 1973	p,p' - DDE	100	Rat (*Rattus norvegicus*)	2	0/150	mg/kg diet	N	na	ADL	U	FD	21	d	NR	NR	JV	M	C	Lab	GRO	GRO	BDWT	WO	150		Y	0.218	N	0.021590	13.5		10	10	5	10	6	8	4	10	10	4	77
162	3208	Bunyan and Page, 1973	p,p' - DDMU	100	Rat (*Rattus norvegicus*)	2	0/150	mg/kg diet	N	na	ADL	U	FD	21	d	NR	NR	JV	M	C	Lab	GRO	GRO	BDWT	WO	150		Y	0.216	N	0.019493	13.5		10	10	5	10	6	8	4	10	10	4	77
163	3209	Bunyan et al., 1972	p,p' - DDT	100	Rat (*Rattus norvegicus*)	2	0/150	mg/kg diet	N	na	ADL	U	FD	21	d	NR	NR	JV	M	C	Lab	GRO	GRO	BDWT	WO	150		Y	0.211	N	0.019121	13.6		10	10	5	10	6	8	4	10	10	4	77
164	3209	Bunyan et al., 1972	p,p' - DDE	100	Rat (*Rattus norvegicus*)	4	0/50/100/150	mg/kg diet	N	na	ADL	U	FD	21	d	NR	NR	JV	M	C	Lab	GRO	GRO	BDWT	WO	150		Y	0.206	N	0.018748	13.7		10	10	5	10	6	8	4	10	10	4	77
165	14714	Fitzhugh and Nelson, 1947	DDT - Technical	100	Rat (*Rattus norvegicus*)	5	0/200/400/600/800	mg/kg diet	N	na	ADL	U	FD	12	w	21	d	JV	F	V	Lab	GRO	GRO	BDWT	WO	200	400	N	0.2037	N	0.018576	16.9	33.7	10	10	5	10	5	8	10	10	10	4	82
166	961	Foster, 1968	DDD	100	Rat (*Rattus norvegicus*)	3	0/100/200	mg/kg diet	N	na	ADL	U	FD	43	d	NR	NR	JV	M	C	Lab	GRO	GRO	BDWT	WO	200		Y	0.258	N	0.022558	17.5		10	10	5	10	6	8	4	10	10	4	77
167	961	Foster, 1968	DDT - Technical	100	Rat (*Rattus norvegicus*)	3	0/100/200	mg/kg diet	N	na	ADL	U	FD	42	d	NR	NR	JV	M	C	Lab	GRO	GRO	BDWT	WO	200		Y	0.247	N	0.021765	17.6		10	10	5	10	6	8	4	10	10	4	77
168	3172	Banerjee and Pasha, 1996	p,p' - DDD	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg diet	N	na	ADL	U	FD	6	w	NR	NR	JV	M	C	Lab	GRO	GRO	BDWT	WO	200		Y	0.1427	N	0.013864	19.4		10	10	5	10	6	8	4	10	10	4	77
169	3172	Banerjee and Pasha, 1996	p,p' - DDT	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg diet	N	na	ADL	U	FD	6	w	NR	NR	JV	M	C	Lab	GRO	GRO	BDWT	WO	200		Y	0.142	N	0.013808	19.4		10	10	5	10	6	8	4	10	10	4	77
170	3172	Banerjee and Pasha, 1996	p,p' - DDE	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg diet	N	na	ADL	U	FD	6	w	NR	NR	JV	M	C	Lab	GRO	GRO	BDWT	WO	200		Y	0.13875	N	0.013548	19.5		10	10	5	10	6	8	4	10	10	4	77
171	3172	Banerjee and Pasha, 1996	DDA	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg diet	N	na	ADL	U	FD	6	w	NR	NR	JV	M	C	Lab	GRO	GRO	BDWT	WO	200		Y	0.1345	N	0.013206	19.6		10	10	5	10	6	8	4	10	10	4	77
172	14960	Treon et al, 1951	DDT - Technical	92	Rat (*Rattus norvegicus*)	6	0/2.5/5.0/25/75/300	mg/kg diet	N	na	DLY	U	FD	20	w	NR	NR	JV	B	C	Lab	GRO	GRO	BDWT	WO	300		Y	0.37512	N	0.030685	22.6		10	10	5	10	6	8	4	1	10	4	68
173	1020	Kimbrough et al. 1971	DDT - Technical	100	Rat (*Rattus norvegicus*)	3	0/12.93/26.5	mg/kg bw/d	N	na	ADL	U	FD	8	w	3-4	mo	JV	M	C	Lab	GRO	GRO	BDWT	WO	26.5		N	0.578	N	0.043779	26.5		10	10	5	10	10	8	4	6	10	4	77
174	3804	Rossi et al., 1983	p,p' - DDE	99	Syrian golden hamster (*Mesocricetus auratuss*)	3	0/500/1000	mg/kg diet	N	na	ADL	UX	FD	72	w	8	w	JV	B	V	Lab	GRO	GRO	BDWT	WO	500	1000	Y	0.140	N	0.013648	48.3	96.5	10	10	10	10	6	8	10	10	10	4	88
175	3214	Cannon and Holcomb, 1968	DDT	100	Mouse (*Mus musculus*)	3	0/200/300	mg/kg diet	N	na	ADL	U	FD	55	d	4-5	mo	JV	M	C	Lab	GRO	GRO	BDWT	WO	300		Y	0.0247	Y	0.0050	60.7		10	10	5	10	7	8	4	1	10	4	69
176	3349	Cecil et al., 1971	o,p '- DDT	99	Rat (*Rattus norvegicus*)	6	0/50/100/250/500/1000	mg/kg diet	N	na	ADL	U	FD	7	d	22	d	JV	F	C	Lab	GRO	GRO	BDWT	WO	1000		Y	0.0689	Y	0.00530	76.2		10	10	5	10	7	8	4	1	10	4	69
177	3380	Hoffman et al., 1970	DDT - Technical	88	Rat (*Rattus norvegicus*)	15	0/0.5/2/4/8/16/32/64/178/256/512/750/1024/1550/2048	mg/kg diet	N	na	ADL	U	FD	14	d	NR	NR	JV	M	C	Lab	GRO	GRO	BDWT	WO	1024	1550	Y	0.12	N	0.012024	90.3	137	10	10	5	10	6	8	10	10	10	4	83
178	3555	Platt and Cockrill, 1969	DDT	100	Rat (*Rattus norvegicus*)	2	0/0.10	% in diet	Y	na	ADL	U	FD	14	d	NR	NR	JV	M	C	Lab	GRO	GRO	BDWT	WO	0.1		Y	0.2	N	0.018298	96.3		10	10	5	10	6	8	4	1	10	4	68
179	3804	Rossi et al., 1983	DDT - Technical	100	Syrian golden hamster (*Mesocricetus auratuss*)	2	0/1000	mg/kg diet	N	na	ADL	UX	FD	72	w	8	w	JV	B	V	Lab	GRO	GRO	BDWT	WO	1000		Y	0.130	N	0.015421	98.8		10	10	10	10	6	8	4	1	10	4	73
180	3433	Krause et al., 1975	DDT	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg bw/d	N	na	DLY	U	GV	14	d	4	d	JV	M	V	Lab	GRO	GRO	BDWT	WO	200		Y	0.032	N	0.0040569	200		10	8	10	10	10	8	4	1	10	4	75
181	3224	Chowdhury et al., 1990	DDT - Technical	100	Rat (*Rattus norvegicus*)	2	0/0.2	mg/kg bw/d	N	na	DLY	U	GV	120	d	NR	NR	JV	M	V	Lab	GRO	GRO	BDWT	WO		0.20	Y	0.3243	N	0.027224		0.20	10	8	10	10	10	8	4	10	10	4	84

Appendix 6.1 Mammalian Toxicity Data Extracted for Wildlife Toxicity Reference Value (TRV)
DDT and Metabolites

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	78	General Effect Group	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
182	14719	Wilson et al., 1946	DDT	100	Sheep (*Ovis aries*)	2	0/62	mg/kg diet	N	na	DLY	U	FD	94	d	NR	NR	JV	NR	C	NR	GRO	GRO	BDWT	WO		62.0	Y	48.32	Y	1.360		1.75	10	10	5	10	7	8	4	10	10	4	78
183	3163	Ali and Shakoori, 1996	DDT	75	Rat (*Rattus norvegicus*)	2	0/10	mg/kg bw/d	N	na	ADL	U	FD	18	mo	3	mo	JV	NR	C	Lab	GRO	GRO	BDWT	WO		10	Y	0.34187	Y	0.030		7.50	10	10	5	10	10	8	4	10	10	4	81
184	3163	Ali and Shakoori, 1996	DDT	75	Rat (*Rattus norvegicus*)	2	0/20	mg/kg bw/d	N	na	ADL	U	FD	9	d	5	mo	JV	NR	C	Lab	GRO	GRO	BDWT	WO		20	Y	0.1677	Y	0.030		15.0	10	10	5	10	10	8	4	10	10	4	81
185	3672	Yagi et. al., 1979	p,p' - DDT	100	Rat (*Rattus norvegicus*)	2	0/583	mg/kg diet	N	na	ADL	U	FD	50	d	NR	NR	JV	M	C	Lab	GRO	GRO	BDWT	WO		583	Y	0.3918	N	0.031802		47.3	10	10	5	10	6	8	4	10	10	4	77
186	14715	Laug and Fitzhugh, 1946	DDT - Commercial	100	Rat (*Rattus norvegicus*)	3	0/800/1200	mg/kg diet	N	na	DLY	U	FD	6	mo	21	d	JV	M	C	Lab	GRO	GRO	BDWT	WO		800	N	0.4702	N	0.036946		62.9	10	10	5	10	5	8	4	10	10	4	76
Survival																																																	
187	3649	Ware and Good, 1967	DDT - Technical	77.2	Mouse (*Mus musculus*)	2	0/7	mg/kg diet	N	na	ADL	U	FD	120	d	6	w	GE	B	V	Lab	MOR	MOR	MORT	WO	7.0		N	0.02223	N	0.0030148	0.863		10	10	5	10	5	9	4	1	10	4	68
188	3649	Ware and Good, 1967	DDT - Technical	77.2	Mouse (*Mus musculus*)	2	0/7	mg/kg diet	N	na	ADL	U	FD	120	d	NR	NR	GE	B	V	Lab	MOR	MOR	MORT	WO	7.0		N	0.02223	N	0.0030148	0.989		10	10	5	10	5	9	4	10	10	4	77
189	3527	Ortega et al, 1957	p,p' - DDT	100	Rat (*Rattus norvegicus*)	7	0/5/15/50/200/400/1000	mg/kg diet	N	na	ADL	U	FD	6	mo	NR	NR	JV	B	C	Lab	MOR	MOR	MORT	WO	15	50	Y	0.1	N	0.010350	1.55	5.18	10	10	5	10	6	9	8	10	10	4	82
190	14964	Treon et al , 1953	p,p' - DDT	99.7	Rat (*Rattus norvegicus*)	4	0/2.5/12.5/25.0	mg/kg diet	N	na	DLY	U	FD	28	w	27	d	JV	B	C	Lab	MOR	MOR	MORT	WO	25		Y	0.3738	N	0.030596	2.04		10	10	5	10	6	9	4	1	10	4	69
191	3666	Wolfe et al., 1979	DDT	100	Field mouse (*Peromyscus polionotus*)	3	0/0.24/2.4	mg/kg bw/d	N	na	ADL	U	FD	15	mo	60	d	JV	B	V	Lab	MOR	MOR	MORT	WO	2.4		Y	0.0151	Y	0.0020	2.40		10	10	5	10	10	9	4	10	10	4	82
192	3221	Cecil et al, 1975	DDT - Technical	90	Sheep (*Ovis aries*)	2	0/0.2	g/org/d	N	na	ADL	U	FD	17	w	1	yr	JV	F	C	Lab	MOR	MOR	MORT	WO	0.2		N	70	Y	1.10	2.57		10	10	5	10	6	9	4	10	10	4	78
193	14960	Treon et al, 1951	p,p' - DDT	100	Rat (*Rattus norvegicus*)	6	0/2.5/5.0/25/75/300	mg/kg diet	N	na	DLY	U	FD	27	w	NR	NR	JV	B	C	Lab	MOR	MOR	MORT	WO	75	300	Y	0.388	N	0.031548	6.10	24.4	10	10	5	10	6	9	8	10	10	4	82
194	3221	Cecil et al, 1975	DDT - Technical	90	Rat (*Rattus norvegicus*)	2	0/100	mg/kg diet	N	na	ADL	U	FD	20	w	60-90	d	JV	F	C	Lab	MOR	MOR	MORT	WO	100		N	0.2024	N	0.018478	8.22		10	10	5	10	5	9	4	10	10	4	77
195	3173	Banerjee et al., 1995	p,p' - DDT	100	Rat (*Rattus norvegicus*)	4	0/20/50/100	mg/kg diet	N	na	ADL	U	FD	4	w	NR	NR	JV	M	V	Lab	MOR	MOR	MORT	WO	100		Y	0.125	N	0.012434	9.95		10	10	5	10	6	9	4	10	10	4	78
196	3802	Bernard and Gaertner, 1964	DDT - Technical	100	Mouse (*Mus musculus*)	5	0/100/200/300/600	mg/kg diet	N	na	ADL	U	FD	73	d	4	mo	JV	B	C	Lab	MOR	MOR	MORT	WO	100	200	N	0.0317	N	0.0040256	12.7	25.4	10	10	5	10	5	9	10	10	10	4	83
197	961	Foster, 1968	DDD	100	Rat (*Rattus norvegicus*)	3	0/100/200	mg/kg diet	N	na	NR	U	FD	42	d	NR	NR	JV	M	C	Lab	MOR	MOR	MORT	WO	200		Y	0.258	N	0.022558	17.5		10	10	5	10	6	9	4	10	10	4	78
198	961	Foster, 1968	DDT - Technical	100	Rat (*Rattus norvegicus*)	3	0/100/200	mg/kg diet	N	na	NR	U	FD	42	d	NR	NR	JV	M	C	Lab	MOR	MOR	MORT	WO	200		Y	0.247	N	0.021765	17.6		10	10	5	10	6	9	4	10	10	4	78
199	3172	Banerjee and Pasha, 1996	p,p' - DDD	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg diet	N	na	ADL	U	FD	6	w	NR	NR	JV	M	C	Lab	MOR	MOR	MORT	WO	200		Y	0.1427	N	0.013864	19.4		10	10	5	10	6	9	4	10	10	4	78
200	3172	Banerjee and Pasha, 1996	p,p' - DDT	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg diet	N	na	ADL	U	FD	6	w	NR	NR	JV	M	C	Lab	MOR	MOR	MORT	WO	200		Y	0.142	N	0.013808	19.4		10	10	5	10	6	9	4	10	10	4	78
201	3172	Banerjee and Pasha, 1996	p,p' - DDE	100	Rat (*Rattus norvegicus*)	2	0/200	mg/kg diet	N	na	ADL	U	FD	6	w	NR	NR	JV	M	C	Lab	MOR	MOR	MORT	WO	200		Y	0.13875	N	0.013548	19.5		10	10	5	10	6	9	4	10	10	4	78
202	14960	Treon et al, 1951	DDT - Technical	92	Rat (*Rattus norvegicus*)	6	0/2.5/5.0/25/75/300	mg/kg diet	N	na	DLY	U	FD	27	w	NR	NR	JV	B	C	Lab	MOR	MOR	MORT	WO	300		Y	0.37512	N	0.030685	22.6		10	10	5	10	6	9	4	10	10	4	78
203	3233	Craig and Ogilvie, 1974	DDT - Technical	100	Mouse (*Mus musculus*)	2	0/200	ug/g diet	N	na	NR	U	FD	6	w	NR	NR	GE	F	C	Lab	MOR	MOR	MORT	WO	200		N	0.0325	N	0.0041089	25.3		10	10	5	10	5	9	4	10	10	4	77
204	73	Clark and Stafford, 1981	DDE	100	Little brown bat (*Myotis lucifugus*)	3	0.1/150/480	mg/kg diet	N	na	DLY	M	FD	8	d	NR	NR	AD	F	C	Lab	MOR	MOR	MORT	WO	150	480	Y	0.00633	N	0.0010708	25.4	81.2	10	10	10	10	6	9	8	10	6	4	83
205	74	Clark and Kroll 1977	DDE	100	Free-tailed bat (*Tadarida brasiliensis*)	2	0/107	mg/kg diet	N	na	DLY	M	FD	40	d	NR	NR	AD	F	C	Lab	MOR	MOR	MORT	WO	107		Y	0.00931	N	0.0027715	31.9		10	10	10	10	6	9	4	10	3	4	76
206	3865	Hayes, 1976	DDT - Technical	99.5	Rat (*Rattus norvegicus*)	2	0/32.4	mg/kg bw/d	N	na	DLY	U	FD	116	d	21	d	GE	F	C	Lab	MOR	MOR	MORT	WO	32.4		N	0.2024	Y	0.0000133	32.2		10	10	5	10	10	9	4	1	10	4	73
207	14714	Fitzhugh and Nelson, 1947	DDT - Technical	100	Rat (*Rattus norvegicus*)	5	0/100/200/400/800	mg/kg diet	N	na	ADL	U	FD	12	mo	21	d	JV	M	V	Lab	MOR	MOR	MORT	WO	400	800	N	0.263	N	0.022917	34.9	69.7	10	10	5	10	5	9	10	10	10	4	83
208	3380	Hoffman et al., 1970	DDT - Technical	88	Rat (*Rattus norvegicus*)	15	0/0.5/2/4/8/16/32/64/178/256/512/750/1024/1550/2048	mg/kg diet	N	na	ADL	U	FD	14	d	NR	NR	JV	M	C	Lab	MOR	MOR	MORT	WO	1024	1550	Y	0.12	N	0.012024	90.3	137	10	10	5	10	6	9	10	10	10	4	84
209	3804	Rossi et al., 1983	p,p' - DDE	99	Syrian golden hamster (*Mesocricetus auratuss*)	3	0/500/1000	mg/kg diet	N	na	ADL	UX	FD	52	w	8	w	JV	F	V	Lab	MOR	MOR	SURV	WO		500	Y	0.140	N	0.013648	96.5		10	10	10	10	6	9	4	1	10	4	74
210	3804	Rossi et al., 1983	DDT - Technical	100	Syrian golden hamster (*Mesocricetus auratuss*)	2	0/1000	mg/kg diet	N	na	ADL	UX	FD	120	w	8	w	JV	B	V	Lab	MOR	MOR	SURV	WO	1000		Y	0.130	N	0.015421	119		10	10	10	10	6	9	4	1	10	4	74
211	14714	Fitzhugh and Nelson, 1947	DDT - Technical	100	Rat (*Rattus norvegicus*)	5	0/200/400/600/800	mg/kg diet	N	na	ADL	U	FD	12	mo	21	d	JV	F	V	Lab	MOR	MOR	MORT	WO		200	N	0.4	N	0.032348		15.3	10	10	5	10	5	9	4	10	10	4	77
212	3214	Cannon and Holcomb, 1968	DDT	100	Mouse (*Mus musculus*)	3	0/200/300	mg/kg diet	N	na	ADL	U	FD	55	d	4-5	mo	JV	B	C	Lab	MOR	MOR	SURV	WO		200	Y	0.0251	Y	0.0050		39.8	10	10	5	10	7	9	4	10	10	4	79
213	14715	Laug and Fitzhugh, 1946	DDT - Commercial	100	Rat (*Rattus norvegicus*)	3	0/800/1200	mg/kg diet	N	na	DLY	U	FD	6	mo	21	d	JV	M	C	Lab	MOR	MOR	MORT	WO		800	N	0.4702	N	0.036946		62.9	10	10	5	10	5	9	4	10	10	4	77
Data Not Used to Derive TRV																																																
3	3669	Wrenn et al., 1971	o,p '- DDT	100	Sheep (*Ovis aries*)	2	0/10	mg/kg diet	N	na	ADL	U	FD	9	mo	18-19	mo	GE	F	C	Lab	BIO	CHM	GLUC	LI	10		N	38	N	1.366	0.371		10	10	5	10	5	1	4	6	10	4	65
214	14964	Treon et al , 1953	p,p' - DDT	99.7	Rat (*Rattus norvegicus*)	4	0/2.5/12.5/25.0	mg/kg diet	N	na	DLY	U	FD	28	w	27	d	JV	B	C	Lab	PTH	ORW	SMIX	LI	25		Y	0.3738	N	0.030596	2.04		10	10	5	10	6	4	4	1	10	4	64
215	3447	Lindenau et al, 1994	DDT - Technical	100	Rabbit (*Oryctolagus cuniculus*)	2	0/3	mg/kg bw/d	N	na	3 per w	U	GV	12	w	NR	NR	SM	F	V	Lab	BIO	HRM	PRGS	SR	3.0		Y	4.5	N	0.23654	3.0		10	8	10	10	10	1	4	1	3	4	61
216	14719	Wilson et al., 1946	DDT	100	Cattle (*Bos taurus*)	2	0/1.60	g/kg bw/d	N	na	DLY	U	FD	141	d	NR	NR	AD	NR	C	NR	BIO	CHM	HMGL	BL	1.60		Y	532	Y	18.0	3.53		10	10	5	10	10	1	4	1	3	4	58
217	3173	Banerjee et al., 1995	p,p' - DDT	100	Rat (*Rattus norvegicus*)	4	0/20/50/100	mg/kg diet	N	na	ADL	U	FD	4	w	NR	NR	JV	M	V	Lab	PTH	ITX	GITX	WO	100		Y	0.125	N	0.012434	9.95		10	10	5	10	6	4	4	1	10	4	64
218	3202	Braham and Neal, 1974	DDT	100	Short tail shrew (*Blarina brevicauda*)	2	0/16.55	mg/kg diet	N	na	DLY	M	FD	3	w	NR	NR	NR	M	C	Lab	PTH	ORW	ORWT	LI	16.55		N	0.017	Y	0.0120	11.7		10	10	10	10	6	4	4	1	3	4	62
219	961	Foster, 1968	DDD	100	Rat (*Rattus norvegicus*)	1	0/100/200	mg/kg diet	N	na	NR	U	FD	42	d	NR	NR	JV	M	C	Lab	BIO	HRM	CRTS	AR	200		Y	0.247	N	0.022558	17.5		10	10	5	10	6	1	4	3	10	4	63
220	961	Foster, 1968	DDT - Technical	100	Rat (*Rattus norvegicus*)	2	0/100/200	mg/kg diet	N	na	NR	U	FD	42	d	NR	NR	JV	M	C	Lab	BIO	HRM	CRTS	AR	200		Y	0.258	N	0.021765	17.6		10	10	5	10	6	1	4	3	10	4	63
221	14714	Fitzhugh and Nelson, 1947	DDT - Technical	100	Rat (*Rattus norvegicus*)	5	0/200/400/600/800	mg/kg diet	N	na	ADL	U	FD	24	mo	21	d	JV	B	V	Lab	BEH	FDB	FCNS	WO	800		N	0.55	N	0.042028	69.7		10	10	5	10	5	4	4	1	10	4	63
222	3349	Cecil et al., 1971	o,p '- DDT	99	Rat (*Rattus norvegicus*)	6	0/50/100/250/500/1000	mg/kg diet	N	na	ADL	U	FD	7	d	22	d	JV	F	C	Lab	BEH	FDB	FCNS	WO	1000		Y	0.0689	Y	0.00530	76.2		10	10	5	10	7	4	4	1	10	4	65
223	3652	Wassermann et al,	p,p' - DDT	100	Rat (*Rattus norvegicus*)	2	0/200	mg/L	N	na	ADL	U	DR	5	w	NR	NR	JV	M	V	Lab	BIO	CHM	ALBM	SR		200	N	0.000235	N	0.0000537		45.7	10	5	5	10	5	1	4	10	10	4	64

All abbreviations and definitions are used in coding studies are available from Attachment 4-3 of the Eco-SSL *guidance* (U.S. EPA 2003).

*Duplicate values for NOAELs and LOAELs for the same reference represent results from different experimental designs and are identified by different Phase numbers.