

Contaminants in Fish and Game Animals
on Rocky Mountain Arsenal 1983 - 1984

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Contaminants in Fish and Game Animals on Rocky Mountain Arsenal
Results of Chemical Analyses 1983 and 1984

A biological monitoring program was begun on Rocky Mountain Arsenal in 1977. Phase 1 of this program was a screening study to determine the general extent of contaminants in the biota. Some of the results of this study indicated that the fish and game animals on the Arsenal were taking up contaminants.

Since the screening study in 1977, the fish and game animals have been sampled annually to monitor their status on contamination. Results of the studies for 1977 through 1982 were given in a previous report (Contaminants in Fish and Game Animals on Rocky Mountain Arsenal 1977 - 1982, David S. Thorne, December 1982, Rocky Mountain Arsenal Information Center Acquisition No. 83042R01). The present report gives the results for 1983 and 1984.

DEPARTMENT OF THE ARMY
ROCKY MOUNTAIN ARSENAL
COMMERCE CITY, COLORADO 80022

SMCRM-TOE-C,

23 April 1984

MEMORANDUM FOR DIRECTOR OF TECHNICAL OPERATIONS

SUBJECT: Chemical Monitoring of Fish and Game Animals on Rocky Mountain Arsenal

1. The fish and small game animals on Rocky Mountain Arsenal (RMA) are sampled annually to determine the levels of pesticides and other contaminants in their tissues in order to evaluate any potential health risks.
2. Tables I-VII present the results of chemical analysis of pheasants, ducks, mourning doves, rabbits and fish taken on RMA and ~~pheasants~~ and mourning doves taken off post by the Colorado Division of Wildlife (CDW) in calendar year 1983. A table for pheasants taken off post is not included because none of the contaminants were detected in any of the eight birds collected.
3. The Environmental Protection Agency (EPA) has established tolerances for certain unavoidable contaminants that find their way into food. Also, the Food and Drug Administration (FDA) has established temporary "action levels" for some contaminants for which an EPA tolerance has not been determined. Tolerances and action levels are limits at which the FDA can take legal action to remove adulterated products from commercial trade. Where no established tolerance or action level exists for an adulterating substance, FDA is authorized to take action at the minimum detection level of the substance. The most recently published list of FDA action levels gives concentration levels of 0.30 ppm for aldrin, dieldrin or endrin in fish or the fat of meat and 5.0 ppm for DDT or DDE, singly or in combination, in fish (Action Levels for Poisonous or Deleterious Substances in Human Food and Animal Feed, Sep 1982, FDA Industry Programs, Bureau of Foods, HF 326, 200 C Street SW, Washington, D.C. 20204). EPA has established a tolerance of 5.0 ppm for DDT or DDE, singly or in combination, in the fat of meat (40 CFR 180, Jul 1980). FDA lists an action level of 1.00 ppm for mercury in fish but none is listed for meat or fat. No other tolerances or action levels are established for the other contaminants found in the game animals on RMA. Since the chlorinated pesticides tend to localize in the fat, the concentrations for these substances would be somewhat higher on a fat basis than the analyses reported in this study which utilized the whole edible portion of the animals.
4. The U.S. Army Medical Research and Development Command (USAMRDC) has proposed a temporary guideline of 0.5 ppm for DIMP as the maximum allowable concentration in food for human consumption (Statement on the Status of Research into Biological Effects of Environmental Contaminants at Rocky Mountain Arsenal, Committee on Military Environmental Research, National Academy of Science, Washington, D.C., Jan 1977).

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5. The chorophenylmethyl sulfur compounds have shown indications of being potential carcinogens (meeting of the Committee on Military Environmental Research, Sub-Committee on Land Renovation, National Academy of Science, Washington, D.C., Apr 5, 1979).
6. Again this year, as in 1982, the only pheasants showing any of the contaminants were taken from the immediate vicinity of Basin F. The three pheasants taken in this area contained dieldrin, one exceeding the FDA action level (0.3 ppm); two contained fairly high levels of mercury and one contained a fairly high level of CPM02 (Table I).
7. Twelve of the 15 ducks contained dieldrin; two birds, both from Basin D, exceeded the FDA action level (0.3 ppm). Mercury was present in 12 of the ducks, two exceeding the FDA action level of 1.00 ppm (Table II). No mercury was found in ducks in 1981 or 1982.
8. The mourning doves showed more widespread contamination this year than in the previous two years. Nine of the 15 birds contained dieldrin, four exceeding the FDA action level (0.3 ppm). Two of these were from the immediate vicinity of Basin F, but the other two were from relatively clean areas. One of these birds from Basin F contained a fairly high level of endrin and another a fairly high level of CPM02 (Table IV). Last year only one of 15 mourning doves showed any of the contaminants and this was just a small amount of dieldrin. In 1981 high levels of dieldrin, endrin and CPM02 were found in mourning doves but only in birds taken from Basin F and the South Plants areas.
9. Again this year, as in the previous two years, the only cottontails showing contamination were taken from Basin F and the South Plants-lakes areas. Seven of the 15 rabbits contained dieldrin; one from the South Plants area exceeded the FDA action level (0.3 ppm). One rabbit from Basin F contained mercury and this was in excess of the FDA action level (1.00 ppm); this rabbit also contained some CPM02 (Table VI).
10. Relatively high levels of mercury continue to occur in fish from Lakes Mary, Ladora and Lower Derby. Average mercury concentrations were 0.29 ppm in Lake Mary, 0.72 ppm in Ladora and 0.37 ppm in Lower Derby. Four fish from Ladora exceeded the FDA action level (1.00 ppm). The only other contaminants found were small amounts of dieldrin, DDT and DDE, none exceeding the FDA action levels for these substances (Table VII).
11. Of the birds collected off post, five of the eight mallards contained small amounts of dieldrin and one other contained a fairly high level of mercury (Table III). One of the ten mourning doves contained very small amounts of dieldrin and DDE (Table V). None of the pheasants were contaminated.

EDWIN W. BERRY
Acting Chief, Compliance
and Resources Branch

Table 1

Contaminants in Breast and Leg Meat
of Pheasants from RMA - 1983 ^{1/}

Location ^{2/}	Sex	Age	Contaminant (ppm) ^{3/}			
			DLDN	CPM02	ENDN	HG
Section 07-09	F	Juv	BDL	BDL	BDL	BDL
" "	M	Juv	BDL	BDL	BDL	BDL
" "	M	Juv	BDL	BDL	BDL	BDL
" "	M	Juv	BDL	BDL	BDL	BDL
" 24-15	F	Juv	BDL	BDL	BDL	BDL
" "	F	Juv	BDL	BDL	BDL	BDL
" "	M	Juv	BDL	BDL	BDL	BDL
" 24-08	M	Ad	BDL	BDL	BDL	BDL
" 30-01	M	Ad	BDL	BDL	BDL	BDL
" 31-05	M	Ad	BDL	BDL	BDL	BDL
" 06-05	M	Ad	BDL	BDL	BDL	BDL
" 01-11	M	Ad	BDL	BDL	BDL	BDL
" 26-09	M	Juv	0.58	BDL	0.05	BDL
" 26-14	M	Juv	0.03	BDL	BDL	0.41
" 26-14	F	Ad	0.04	0.66	BDL	0.50

1/ Taken 2-25 August 1983

2/ Locations:

- Section 07-09 - Highline Canal, NW corner of section 7
- Section 24-15 - East of Bog
- Section 24-08 - SE corner of section 24
- Section 30-01 - SW corner of section 30
- Section 31-05 - SW corner of section 31
- Section 06-05 - Shore of Upper Derby arm
- Section 01-11 - North shore of Upper Derby, east of Plants area
- Section 26-09 - Just west of Basin F fence
- Section 26-14 - Just north of Basin F fence

Table 1

Contaminants in Breast and Leg Meat
of Pheasants from RMA - 1983 (continued)

<u>3/ Contaminants</u>	<u>Symbol</u>	<u>Detection Level (ppm)</u>
Aldrin	ALDN	0.02
Chlorophenylmethylsulfide	PCPMS	0.20
Cpm-sulfone	CPH02	0.20
Cpm-sulf oxide	CPMSO	0.20
Dibromochloropropane	DBCP	0.02
Dichlorodiphenyltrichloroethylene	DDE	0.02
Dichlorodiphenyltrichloroethane	DDT	0.02
Dieldrin	DLDN	0.02
Diisopropylmethylphosphonate	DIMP	0.05
Dithiane	DITH	0.20
Endrin	ENDN	0.02
Isodrin	ISOD	0.02
Mercury	HG	0.20
Oxathiane	OXAT	0.20

ALDN, PCPMS, CPMSO, DBCP, DDE, DDT, DIMP, DITH, ISOD, and OXAT were below their detection levels (BDL).

Table II

Contaminants in Breast and Leg Meat
of Mallards from RMA - 1983 ^{1/}

<u>Location</u>	<u>Sex</u>	<u>Age</u>	<u>Contaminant (ppm) ^{2/}</u>			
			<u>DLDN</u>	<u>HG</u>	<u>DDE</u>	<u>DDT</u>
Uvalda Ditch	F	Ad	BDL	BDL	BDL	BDL
" "	M	Ad	0.06	BDL	0.06	BDL
" "	F	Ad	0.05	0.65	BDL	BDL
Pond, Sec II	M	Ad	0.07	0.22	BDL	BDL
" "	M	Ad	BDL	BDL	BDL	BDL
" "	M	Ad	0.18	1.00	0.03	BDL
North Bog	M	Juv	0.08	0.75	0.09	0.02
" "	F	Juv	0.12	0.29	0.16	0.03
" "	F	Juv	0.09	0.46	0.12	BDL
" "	F	Juv	0.10	0.41	0.13	BDL
R&G Club Pond	M	Ad	BDL	0.51	0.04	BDL
TGY Pond	M	Juv	0.02	0.79	0.03	BDL
Basin D Pond	F	Ad	0.84	1.79	0.05	BDL
" "	M	Juv	0.11	0.29	BDL	BDL
" "	F	Juv	0.54	0.98	BDL	BDL

^{1/} Taken 11 Aug-9 September 1983

^{2/} See Table I for symbols. ALDN, PCPMS, CPM02, CPMS0, DBCP, DIMP, DITH, ENDN, ISOD and OXAT were below their detection levels (BDL).

Table III

Contaminants in Breast and Leg Meat
of Mallards from Off Post - 1983 ^{1/}

<u>Date</u>	<u>Sex</u>	<u>Age</u>	<u>Contaminant (ppm) ^{2/}</u>	
			<u>DDE</u>	<u>HG</u>
22 Aug	F	Ad	BDL	0.29
22 Aug	M	Juv	BDL	BDL
23 Aug	F	Ad	0.04	BDL
23 Aug	F	Ad	0.04	BDL
23 Aug	F	Ad	0.02	BDL
25 Aug	F	Ad	0.03	BDL
04 Sep	F	Juv	0.03	BDL
04 Sep	M	Juv	BDL	BDL

1/ All ducks were taken in Weld County.

2/ See Table I for symbols. ALDN, PCPMS, CPM02, CPMS0, DBCP, DDT, DLDN, DIMP, DITH, ENDN, ISOD and OXAT were below their detection levels (BDL).

Table IV

Contaminants in Breast Meat of
Mourning Doves from RMA - 1983 ^{1/}

Location ^{2/}	Contaminant (ppm) ^{3/}			
	DLDN	CPMO2	ENDN	DDE
Section 24-15	0.02	BDL	BDL	BDL
" "	0.48	BDL	0.03	BDL
" "	BDL	BDL	BDL	BDL
" 09-10	BDL	BDL	BDL	BDL
" "	BDL	BDL	BDL	BDL
" "	BDL	BDL	BDL	BDL
" 30-05	0.17	BDL	0.02	BDL
" "	0.51	BDL	0.04	BDL
" "	BDL	BDL	BDL	BDL
" 02-11	0.03	BDL	BDL	BDL
" "	BDL	BDL	BDL	BDL
" "	0.09	BDL	BDL	0.02
" 26-11	1.61	BDL	0.29	BDL
" "	0.04	BDL	BDL	0.11
" "	0.80	0.94	0.09	BDL

1/ Adults; sex undetermined; taken 2-18 August 1983

2/ Locations:

Section 24-15 - East of Bog

Section 09-10 - North of Post Office

Section 30-05 - SW corner of section 30

Section 02-11 - South Plants area

Section 26-11 - Just east of Basin F fence

3/ See Table I for symbols. ALDN, PCPMS, CPMSO, DBCP, DDT, DIMP, DITH, ISOD, HG and OXAT were below their detection levels (BDL).

Table V

Contaminants in Breast Meat of
Mourning Doves from Off Post - 1983 ^{1/}

<u>Date</u>	<u>Location</u>	<u>Contaminant (ppm) ^{2/}</u>	
		<u>DLDN</u>	<u>DDE</u>
20 Aug	Arapahoe County	BDL	BDL
20 Aug	" "	BDL	BDL
22 Aug	Weld County	BDL	BDL
22 Aug	" "	BDL	BDL
22 Aug	" "	BDL	BDL
21 Aug	Boulder County	BDL	BDL
23 Aug	" "	BDL	BDL
14 Aug	Jefferson County	BDL	BDL
04 Sep	" "	BDL	BDL
08 Sep	Adams County	0.02	0.02

1/ Adults; sex undetermined.

2/ See Table I for symbols. ALDN, PCPMS, CPMO2, CPMSO, DBCP, DDT, DIMP, DITH, ENDN, ISOD, HG and OXAT were below their detection limits (BDL).

Table VI

Contaminants in the Meat of
Cottontail Rabbits from RMA - 1983 ^{1/}

<u>Location</u> ^{2/}	<u>Sex</u>	<u>Age</u>	<u>Contaminants (ppm)</u> ^{3/}		
			<u>DLDN</u>	<u>HG</u>	<u>CPM02</u>
Section 12-09	F	Ad	BDL	BDL	BDL
" "	M	Ad	BDL	BDL	BDL
" 11-06	F	Ad	BDL	BDL	BDL
" "	M	Ad	BDL	BDL	BDL
" 23-16	M	Juv	BDL	BDL	BDL
" 01-07	M	Juv	0.03	BDL	BDL
" "	M	Ad	0.03	BDL	BDL
" 34-15	F	Ad	BDL	BDL	BDL
" 34-16	F	Juv	BDL	BDL	BDL
" 01-09	M	Juv	0.06	BDL	BDL
" "	F	Juv	0.08	BDL	BDL
" "	M	Ad	0.43	BDL	BDL
" 26-14	F	Juv	0.20	BDL	BDL
" "	M	Juv	0.10	BDL	BDL
" "	M	Ad	BDL	1.56	0.27

1/ Taken 6 October-2 November 1983

2/ Locations:

- Section 12-09 - South of Rod & Gun Club
- Section 11-06 - North-Central part of section 11
- Section 23-16 - NE corner of section 23
- Section 01-07 - Dike between Upper and Lower Derby Lakes
- Section 34-15 - NE corner of section 34
- Section 34-16 - NE corner of section 34
- Section 01-09 - South Plants area
- Section 26-14 - Just north of Basin F fence

3/ See Table I for symbols. ALDN, PCPMS, CPMSO, DBCP, DDE, DDT, DIMP, DITH, ENDN, ISOD and OXAT were below their detection levels (BDL).

Table VII

Contaminants in Edible Portion (Filets)
of Fish from RMA - 1983 ^{1/}

Lake	Species	Wt. (g)	Contaminant (ppm) ^{2/}			
			DLDN	HG	DDE	DDT
Lower Derby	N. Pike	874	0.05	0.36	0.05	0.05
"	"	803	0.04	0.47	0.08	0.06
"	"	983	0.05	0.37	0.03	0.04
"	"	852	0.05	0.58	0.21	0.09
"	Bl Bullhead	299	0.10	0.41	BDL	0.04
"	"	247	0.11	0.29	BDL	BDL
"	"	242	0.08	0.33	BDL	BDL
"	"	302	0.12	0.34	BDL	BDL
"	"	286	0.09	0.40	BDL	BDL
"	"	262	0.11	0.26	BDL	BDL
"	"	255	0.21	0.21	0.03	BDL
Lake Ladora	N. Pike	7128	0.03	4.50	0.05	0.03
"	"	1759	0.04	0.88	0.05	0.03
"	"	2014	0.03	0.89	0.03	BDL
"	"	4540	0.12	1.23	0.14	0.09
"	L.M. Bass	828	BDL	1.05	BDL	BDL
"	"	253	0.03	0.64	BDL	BDL
"	"	78	0.03	0.79	BDL	BDL
"	"	130	BDL	0.75	BDL	BDL
"	"	92	0.03	0.73	BDL	BDL
"	N. Bluegill	106	0.06	0.44	BDL	BDL
"	"	108	0.09	0.14	BDL	BDL
"	"	112	0.09	0.93	BDL	BDL
"	"	106	0.08	0.42	BDL	BDL
"	"	110	0.04	0.45	BDL	BDL
"	"	106	0.07	0.34	BDL	BDL
"	"	114	0.04	0.15	BDL	BDL
"	"	107	0.03	0.28	BDL	BDL
"	"	101	0.03	0.40	BDL	BDL
"	"	96	0.03	0.24	BDL	BDL

Table VII

Contaminants in Edible Portion (Filets)
of Fish from BMA - 1983 ^{1/} (cont'd)

Lake	Species	Wt. (g)	Contaminant (ppm) ^{2/}			
			DLDN	HG	DDE	DDT
Lake Ladoga	N. Bluegill	99	0.04	BDL	BDL	BDL
"	"	96	0.04	0.35	BDL	BDL
"	"	148	0.05	0.53	0.03	0.03
"	"	118	BDL	1.80	BDL	BDL
"	Bl Bullhead	261	0.03	BDL	BDL	BDL
"	"	296	0.08	0.73	0.03	BDL
"	"	314	0.11	0.64	0.08	BDL
"	"	405	0.10	0.60	0.04	BDL
"	"	300	0.06	0.70	BDL	BDL
"	"	251	0.10	0.86	0.09	BDL
"	"	350	0.07	0.94	0.05	0.04
"	"	265	0.09	0.72	0.03	BDL
"	"	242	0.04	0.66	0.03	BDL
"	"	273	0.05	BDL	BDL	0.04
Lake Mary	L.M. Bass	144	BDL	0.27	BDL	BDL
"	"	154	BDL	0.22	BDL	BDL
"	"	132	BDL	0.23	BDL	BDL
"	"	116	BDL	0.22	BDL	BDL
"	"	130	BDL	0.30	BDL	BDL
"	N. Bluegill	364	0.10	0.28	BDL	BDL
"	C. Catfish	2450	0.16	0.52	0.09	BDL

^{1/} Caught June 17, 1983

^{2/} See Table I for symbols. ALDN, PCPMS, CPMO2, CPMSO, DBCP, DIMP, DITH, ENDN, ISOD and OXAT were below their detection levels (BDL).

CONTAMINANTS IN FISH ON RMA - 1983 (all species)

Lake	No. of Fish	Dieldrin			Mercury			No. of Fish Exc. FDA Action Level
		ug/g (Wet wt.)		Range*	ug/g (Wet wt.)		Range	
		Mean (SE)	Range*		Mean (SE)	Range		
Lower Derby	11	0.09 (0.01)	0.04 - 0.21	0	0.37 (0.03)	0.21 - 0.58	0	
Ladora	33	0.05 (0.006)	Bd1 - 0.12	0	0.72 (0.14)	Bd1 - 4.50	4	
Mary	7	0.04 (0.02)	Bd1 - 0.16	0	0.29 (0.04)	0.22 - 0.52	0	
		DDE			DDT			
Lower Derby	11	0.04 (0.02)	Bd1 - 0.21	0	0.03 (0.01)	Bd1 - 0.09	0	
Ladora	33	0.02 (0.006)	Bd1 - 0.14	0	0.01 (0.003)	Bd1 - 0.09	0	
Mary	7	0.01 (0.01)	Bd1 - 0.09	0	0	---	0	

*Bd1 = Below detectable level

TABLE 1. CONTAMINANTS IN BREAST AND LEG MEAT OF PHEASANTS FROM RMA - 1984¹

LOCATION ²	SEX	AGE	CONTAMINANT (ppm) ³		
			DLDN	CPMO2	ENDN
Section 26-09	M	Ad	1.37	BDL	BDL
" 26-09	M	Ad	2.38	0.36	0.03
" 26-11	M	Ad	0.32	0.28	BDL
" 26-11	M	Ad	1.38	0.41	0.03
" 07-04	M	Ad	BDL*	BDL	BDL
" 07-04	M	Ad	BDL	BDL	BDL
" 07-09	M	Ad	BDL	BDL	BDL
" 24-10	M	Ad	0.03	BDL	BDL
" 24-12	M	Ad	BDL	BDL	BDL
" 30-01	M	Ad	BDL	BDL	BDL
" 30-09	M	Ad	0.02	BDL	BDL
" 01-01	F	Juv	0.02	BDL	BDL
" 01-01	M	Ad	BDL	BDL	BDL
" 06-05	M	Ad	BDL	BDL	BDL

¹ Taken 16-30 August, 1984.

² Locations:

- Section 26-09. West of Basin F fence.
- " 26-11. East of Basin F fence.
- " 07-04. Highline Canal, S.E. corner of Section 7.
- " 07-09. Highline Canal, N.W. Corner of Section 7.
- " 24-10. N.W. corner of Section 24.
- " 24-12. First Creek, N.E. corner of Section 24.
- " 30-01. First Creek, S.W. corner of Section 30.
- " 30-09. First Creek, N.W. corner of Section 30.
- " 01-01. S.W. corner of Section 1.
- " 06-05. Upper arm of Upper Derby Lake.

³ CONTAMINANTS:

CONTAMINANTS:	SYMBOL	DETECTION LEVEL
Aldrin	ALDN	0.02
Chlorophenylmethylsulfide	PCPMS	0.20
Cpm-sulfone	CPMO2	0.20
Cpm-sulfoxide	CPMSO	0.20
Dibromochloropropane	DBCP	0.02
Dichlorodiphenyldichloroethylene	DDE	0.02
Dichlorodiphenyltrichloroethane	DDT	0.02
Dieldrin	DLDN	0.02
Diisopropylmethylphosphonate	DIMP	0.05
Dithiane	DITH	0.20
Endrin	ENDN	0.02
Isodrin	ISOD	0.02
Mercury	HG	0.20
Oxathiane	OXAT	0.20

* ALDN, PCPMS, CPMSO, DBCP, DDE, DDT, DIMP, DITH, ISOD, HG and OXAT were below their detection levels (BDL).

TABLE 2. CONTAMINANTS IN BREAST AND LEG MEAT OF DUCKS FROM RMA¹

1984

LOCATION	SPECIES	SEX	AGE	DLDN	ENDN	HG	CONTAMINANT (ppm) ²		
							DDE	DDT	DDT
Lower Derby	Mallard	M	Ad	0.03	BDL	BDL	0.09	BDL	BDL
Lower Derby	Mallard	M	Ad	BDL	BDL	BDL	0.27	0.05	BDL
Ladora Lake	Mallard	F	Juv	0.46	BDL	BDL	0.16	BDL	BDL
Ladora Lake	Mallard	M	Juv	0.02	BDL	0.62	BDL	BDL	BDL
R & G Club Pond	Mallard	M	Juv	BDL	BDL	0.40	BDL	BDL	BDL
R & G Club Pond	Mallard	M	Ad	0.02	BDL	BDL	0.03	BDL	BDL
Sec II Pond	Mallard	M	Juv	BDL	BDL	0.20	BDL	BDL	BDL
Sec II Pond	Mallard	F	Juv	BDL	BDL	BDL	BDL	BDL	BDL
Sec II Pond	Mallard	F	Juv	BDL	BDL	BDL	BDL	BDL	BDL
Sec II Pond	B.W.Teal	?	Juv	0.29	BDL	BDL	BDL	BDL	BDL
North Bog	B.W.Teal	?	Juv	0.46	0.02	BDL	0.30	BDL	BDL
North Bog	Mallard	M	Juv	0.10	BDL	BDL	0.40	BDL	BDL
North Bog	Mallard	M	Juv	0.05	BDL	BDL	BDL	BDL	BDL
North Bog	Mallard	?	Juv	0.10	BDL	BDL	BDL	BDL	BDL
North Bog	Mallard	M	Juv	0.11	BDL	BDL	BDL	BDL	BDL

¹Taken 8 Aug - 10 Sep, 1984

²See Table 1 for definition of symbols. ALDN, PCPMS, CPMSO, CPMSO2, DBCP, DIMP, DITH, ISOD and OXAT were below their detection levels (BDL).

TABLE 3. CONTAMINANTS IN BREAST AND LEG MEAT OF DUCKS FROM OFF POST¹

1984

LOCATION ²	SEX	AGE	CONTAMINANT (ppm) ³	
			DLDN	DDE
R64WT2N Sec 34	M	Ad	BDL	0.02
R64WT2N Sec 34	F	Ad	BDL	0.02
R64WT2N Sec 34	M	Ad	0.04	0.09
R67WT2N Sec 35	F	Ad	0.02	0.06
R68WT3N Sec 28	M	Ad	BDL	BDL
R68WT3N Sec 28	M	Ad	BDL	BDL

¹ Mallards. Taken 6-7 Sep, 1984

² USGS coordinate system

³ See Table 1 for definition of symbols. ALDN, PCPMS, CPMSO, CPMSO, DBCP, DDT, DIMP, DITH, ENDN, ISOD, HG and OXAT were below their detection levels (BDL).

TABLE 4. CONTAMINANTS IN BREAST MEAT, OF MOURNING DOVES FROM RMA - 1984¹

LOCATION ²	CONTAMINANT (ppm) ³					
	DLDN	ENDN	DDT	CPMO2	DIMP	
Section 09-06	0.03	BDL	BDL	BDL	BDL	BDL
" 10-08	BDL	BDL	BDL	BDL	BDL	BDL
" 11-06	0.27	BDL	BDL	BDL	BDL	BDL
" 30-05	BDL	BDL	BDL	BDL	BDL	BDL
" 30-09	0.43	BDL	0.02	BDL	BDL	BDL
" 31-04	BDL	BDL	BDL	BDL	BDL	BDL
" 24-15	0.02	BDL	BDL	BDL	BDL	BDL
" 24-15	BDL	BDL	BDL	BDL	BDL	BDL
" 24-15	0.02	BDL	BDL	BDL	BDL	BDL
" 01-10	0.21	0.02	BDL	BDL	BDL	BDL
" 02-11	BDL	BDL	BDL	BDL	BDL	BDL
" 26-10	1.19	BDL	BDL	BDL	BDL	BDL
" 26-10	BDL	BDL	BDL	BDL	BDL	0.06
" 26-11	0.87	BDL	BDL	0.42	BDL	BDL

¹ Adults; sex undetermined. Taken 7 Aug - 16 Sep, 1984.

² Locations:
 Section 09-06. East of post office buildings in Section 9.
 " 10-08. Between airport and C Street in Section 10.
 " 11-06. S.W. corner of Section 11.
 " 30-05. First Creek, S.W. corner of Section 30.
 " 30-09. First Creek, N.W. corner of Section 30.
 " 31-04. First Creek, S.E. corner of Section 31.
 " 24-15. First Creek, north boundary
 " 01-10. South Plants area, N.W. corner of Section 1.
 " 02-11. South Plants area, N.E. corner of Section 2.
 " 26-10. West of Basin F fence.
 " 26-11. East of Basin F fence.

³ See Table 1 for definition of symbols. ALDN, PCPMS, CPMSO, DBCP, DDE, DITH, ISOD, HG and OXAT were below their detection levels (BDL).

TABLE 5. CONTAMINANTS IN BREAST MEAT OF MOURNING DOVES FROM OFF POST¹

1984

LOCATION² DDE (ppm)³

R63WT4S	Sec 10	0.06
R63WT4S	Sec 10	0.02
R63WT4S	Sec 10	BDL
R63WT4S	Sec 10	BDL
R64WT4S	Sec 9	BDL
R64WT4S	Sec 9	BDL
R64WT4S	Sec 9	BDL
R64WT4S	Sec 9	BDL
R64WT4S	Sec 9	BDL

¹ Adults; sex undertermined. Taken 6-8 September, 1984

² USGS coordinate grid system

³ See Table 1 for definition of symbols. ALDN, PCPMS, CPMO2, CPMSO, DBCP, DDT, DLDN, DIMP, DITH, ENDN, ISOD, HG and OXAT were below their detection levels (BDL).

TABLE 6. CONTAMINANTS IN MEAT OF COTTONTAIL RABBITS FROM RMA - 1984¹

LOCATION ²	SEX	AGE	CONTAMINANT (ppm) ³	
			DLDN	CPMO2
Section 26-15	M	Ad	0.13	0.77
" 26-15	M	Ad	0.11	BDL
" 26-15	F	Ad	0.22	0.27
" 01-09	F	Ad	0.02	BDL
" 01-09	M	Ad	0.02	BDL
" 01-09	F	Juv	BDL	BDL
" 01-09	M	Ad	BDL	BDL
" 01-07	F	Juv	BDL	BDL
" 01-07	M	Juv	BDL	BDL
" 11-10	M	Ad	BDL	BDL
" 11-10	M	Ad	BDL	BDL
" 12-09	F	Ad	BDL	BDL
" 23-15	M	Ad	BDL	BDL
" 23-16	F	Ad	BDL	BDL
" 23-16	F	Ad	BDL	BDL

¹ Taken 10-26 October, 1984.

² Locations:

- Section 26-15. East of Basin F fence.
- " 01-09. South Plants area, N.W. corner of Section 1.
- " 01-07. Dike between Derby Lakes in Section 1.
- " 11-10. N.W. corner of Section 11.
- " 12-09. N.E. corner of Section 12.
- " 23-15. N.E. corner of Section 23.
- " 23-16. N.E. corner of Section 23.

³ See Table 1 for definition of symbols. ALDN, PCPMS, CPMO2, DBCP, DDE, DDT, DIMP, DITH, ENDN, ISOD, HG and OXAT were below their detection levels (BDL).

TABLE 7. CONTAMINANTS IN EDIBLE PORTION (Filets) OF FISH FROM RMA - 1984¹

LAKE	SPECIES	NO.	WT. (g)	CONTAMINANT (ppm) ²					
				ALDN	ENDN	DLDN	DDT	DDE	HG
Lower Derby	N. Pike	1	4086	BDL	BDL	0.07	BDL	0.05	1.30
"	"	1	3178	"	"	0.07	"	0.03	0.92
"	"	1	1186	"	"	0.06	"	0.03	0.38
"	"	1	946	"	"	0.05	"	0.04	1.17
"	"	1	1148	"	"	0.06	"	0.03	0.47
"	"	1	876	"	"	0.09	"	0.03	7.76
"	"	1	1183	"	"	0.04	"	0.03	0.63
"	"	1	1202	0.02	"	0.19	0.02	0.06	0.50
"	"	1	1060	BDL	"	0.04	BDL	0.03	0.60
"	"	1	1124	"	"	0.10	"	0.03	0.49
"	"	1	2043	"	"	0.10	"	0.04	0.21
"	L.M. Bass	1	1433	"	"	0.14	"	0.05	0.26
"	"	1	1548	0.03	"	0.36	"	0.11	0.71
"	"	1	1552	0.02	"	0.31	"	0.12	0.36
"	"	1	298	BDL	"	0.11	"	0.02	0.55
"	"	1	1680	0.03	"	0.46	0.03	0.13	0.33
"	"	1	1762	0.02	"	0.35	0.03	0.09	0.42
"	"	1	1448	0.02	"	0.41	0.04	0.14	0.14
"	N. Bluegill	1	283	BDL	"	0.14	0.02	0.02	0.29
"	"	1	227	"	"	0.10	0.03	0.03	0.66
"	"	1	66	"	"	0.04	0.02	0.02	0.66
"	"	6	52, 50, 30, 44, 29, 40	"	"	0.16	BDL	BDL	0.48
"	"	7	47, 38, 44, 44, 39, 39, 22	"	"	0.21	"	"	0.36
"	Bl. Bullhead	1	251	"	"	0.18	0.02	0.04	0.28
"	"	1	238	"	"	0.05	BDL	BDL	0.92
"	"	1	290	"	"	0.11	"	0.02	0.92
"	"	1	202	"	"	0.02	"	BDL	0.42
"	"	1	130	"	"	0.03	"	"	0.43
"	"	1	182	"	"	0.08	"	"	0.90
"	"	1	224	"	"	0.05	"	"	0.41
"	"	1	206	"	"	0.10	0.03	0.04	0.81
"	"	1	229	"	"	0.03	0.02	BDL	0.22
"	"	1	234	"	"	0.03	0.02	0.02	0.27
"	"	1	240	"	"	0.03	0.02	BDL	0.49
"	"	1	257	"	"	0.04	0.02	"	0.31

TABLE 7 (Cont'd). CONTAMINANTS IN EDIBLE PORTION (Filets) OF FISH FROM RMA - 1984 ¹
²
 Contaminant (ppm)

LAKE	SPECIES	NO.	WT. (g)	ALDN	ENDN	DLDN	DDT	DDE	HG
Lake Ladora	N. Pike	1	7037	BDL	BDL	BDL	BDL	BDL	1.36
"	"	1	2497	"	"	0.02	0.06	0.07	1.01
"	"	1	2497	"	"	BDL	0.16	0.28	1.25
"	"	1	1858	"	"	0.02	0.02	BDL	0.45
"	"	1	1582	"	"	BDL	0.02	0.02	0.54
"	"	1	2292	"	"	0.02	0.07	0.08	1.30
"	"	1	1800	"	"	0.02	0.07	0.09	0.50
"	"	1	1318	"	"	0.02	0.02	0.03	0.59
"	"	1	977	"	"	0.02	BDL	BDL	0.33
"	"	1	2270	"	"	0.03	0.03	0.03	0.35
"	"	1	1968	"	"	BDL	BDL	0.02	4.16
"	"	1	2270	"	"	0.03	0.03	0.03	0.52
"	L.M. Bass	1	239	"	"	0.03	BDL	0.02	0.33
"	"	1	1710	"	"	0.02	0.03	0.03	1.19
"	"	1	412	"	"	0.02	BDL	BDL	0.61
"	"	1	395	"	"	BDL	"	0.02	0.76
"	"	1	383	"	"	0.03	"	0.02	0.82
"	"	1	91	"	"	0.02	"	BDL	BDL
"	N. Bluegill	1	104	"	"	0.03	"	0.02	0.27
"	"	1	82	"	"	0.05	"	BDL	BDL
"	"	1	98	"	"	0.07	"	"	"
"	"	1	87	"	0.03	0.04	"	0.02	0.90
"	"	1	90	"	BDL	0.03	"	0.02	0.40
"	"	1	86	"	"	0.04	0.50	0.02	1.40
"	"	1	92	"	0.02	0.08	BDL	0.02	0.60
"	"	1	66	"	BDL	0.03	0.03	BDL	1.70
"	"	1	65	"	0.02	0.05	0.03	0.02	0.40
"	"	1	104	"	BDL	0.04	0.03	0.02	0.50
"	"	1	88	"	0.02	0.03	0.03	0.02	0.40
"	"	1	85	"	0.02	0.05	0.06	0.03	0.48
"	"	1	102	"	BDL	0.02	BDL	BDL	0.43
"	"	1	106	"	0.02	0.05	0.08	0.03	0.43
"	Bl. Bullhead	1	234	"	0.02	0.02	BDL	BDL	BDL
"	"	1	297	"	0.02	0.04	0.06	0.02	"
"	"	1	328	"	0.02	0.05	0.05	0.02	"
"	"	1	335	"	0.03	0.06	0.10	0.06	"
"	"	1	326	"	0.02	0.07	0.04	0.02	"
"	"	1	282	"	BDL	0.03	0.05	0.02	"
"	"	1	268	"	"	0.07	0.12	0.05	"
"	"	1	329	"	"	0.04	0.06	0.02	"
"	"	1	329	"	"	0.03	0.08	0.03	"
"	"	1	368	"	"	0.03	0.04	BDL	"

TABLE 7 (Cont'd). CONTAMINANTS IN EDIBLE PORTION (Filets) OF FISH FROM RWA - 1984¹

LAKE	SPECIES	No.	Wt. (g)	CONTAMINANT (ppm) ²					
				ALDN	ENDN	DLDN	DDT	DDE	HG
Lake Mary	L.M. Bass	1	166	BDL	BDL	0.04	0.05	0.03	"
"	"	1	139	"	"	0.02	0.05	BDL	0.33
"	"	1	157	"	"	0.02	0.04	0.02	0.28
"	"	1	136	"	"	0.02	BDL	BDL	BDL
"	"	1	204	"	"	0.02	"	0.02	"
"	"	1	139	"	"	BDL	"	BDL	"
"	"	1	135	"	"	"	"	"	0.90
"	"	1	139	"	"	"	"	"	BDL
"	"	1	183	"	"	0.02	"	0.02	"
"	"	1	192	"	"	0.02	"	BDL	"
"	"	1	176	"	"	BDL	"	"	0.80
"	"	1	177	"	"	0.03	"	"	BDL
"	"	1	165	"	"	0.02	"	"	0.30
"	"	1	171	"	"	0.02	"	"	BDL
"	"	1	161	"	"	0.02	"	"	0.30
"	"	1	171	"	"	0.02	"	"	BDL
"	"	1	161	"	"	0.02	"	0.02	"
"	"	1	147	"	"	0.02	"	BDL	0.28
"	"	1	150	"	"	0.03	"	"	0.46
"	"	1	147	"	"	0.03	"	"	0.30
"	N. Bluegill	1	239	"	"	0.11	"	0.03	0.20
"	"	1	35	"	"	0.11	"	0.03	BDL
"	"	1	165	"	0.02	0.17	"	0.02	0.25
"	"	1	548	"	0.02	0.17	"	0.12	0.20
"	"	1	136	"	BDL	0.08	0.02	BDL	0.22
"	"	1	133	"	"	0.11	0.02	"	0.20
"	"	1	158	"	0.02	0.12	0.04	"	0.20
"	"	1	129	"	0.02	0.12	0.04	"	0.24
"	"	1	133	"	0.03	0.14	0.04	"	0.20
"	"	1	101	"	BDL	0.12	BDL	"	BDL
"	C. Catfish	1	1565	"	"	0.08	0.02	"	"
"	"	1	1055	0.03	"	0.08	0.05	"	"
"	"	1	2043	BDL	0.04	0.22	BDL	0.06	"
"	"	1	1406	"	BDL	0.07	"	0.04	"
"	"	1	991	"	"	0.11	"	0.04	"
"	"	1	1471	"	"	0.12	"	0.07	"
"	"	1	1113	"	"	0.11	"	0.05	"
"	"	1	1099	"	"	0.07	"	0.04	"
"	"	1	1056	"	"	0.10	"	0.06	"
"	"	1	2134	"	0.02	0.14	0.02	0.06	"

¹ Caught 22 May - 5 June, 1985.

² See Table 1 for definition of symbols. PCPM, CPMO2, CPMO, DBCP, DIMP, DITH, ISOD and OXAT were below their detection levels (BDL).

TABLE 8. SUMMARIES OF DIELDRIN, MERCURY, DDE AND DDT¹ IN FISH FROM RMA - 1984 (ALL SPECIES)

LAKE	No. of Fish	DIELDRIN ug/g (wet wt.)			MERCURY ug/g (wet wt.)		
		Range	Mean	No. Fish Exc. FDA Act. Lev. (0.30 ug/g)	Range	Mean	No. Fish Exc. FDA Act. Lev. (1.0 ug/g)
Lower Derby	35	0.02-0.46	0.12	5 (all Bass)	0.14-7.76	0.74	3 (all Pike)
Ladora	42	BDL ² - 0.08	0.02	0	BDL - 4.16	0.57	8
Mary	40	BDL - 0.22	0.07	0	BDL - 0.90	0.57	0
		DDE (5.0 ug/g)			DDT (5.0 ug/g)		
Lower Derby	35	BDL - 0.14	0.036	0	BDL - 0.04	0.009	0
Ladora	42	BDL - 0.28	0.029	0	BDL - 0.50	0.060	0
Mary	40	BDL - 0.12	0.018	0	BDL - 0.05	0.009	0

¹ Trace amounts of Aldrin and Endrin were also detected (refer to Table 7)

² BDL = Below Detection Level