

## **Natural and Pollution Caused Fish Kills in Kansas During 1979-1980**

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### ABSTRACT

Fifty-one fish kills were reported to the Kansas Department of Health and Environment for the 2 year period 1979-1980. Two-thirds of these (34) were pollution caused. The remaining seventeen incidents were caused by natural processes. Natural mortalities led other categories in number of reports (33 percent of total) and number of fish killed (67 percent).

Where pollution was involved and the cause was determined, transportation operations were responsible for both the most reports (eleven) and the greatest number of fish killed (55,432). Agriculture followed, claiming seven reports and 22,175 fish. Municipal operations killed 4170 fish in five incidents. Three reports were associated with Industrial operations, killing 16,000 fish. Eight fish kills in the "Other" and "Undetermined" categories were responsible for killing 3 percent of the fish (8,931).

Twenty incidents killed over 1000 fish each, five of these killed more than 10,000 fish each and one fish kill claimed over 100,000 fish.

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### OVERVIEW

Fifty-one fish kills were investigated by personnel of the Kansas Department of Health and Environment (KDHE) and Kansas Fish and Game (KFG) during the two year period 1979-1980 (Fig. 1). Although this figure appears to indicate an average number of kills higher than the previous eighteen year average (Anonymous, 1979; Haslouer, 1979) it should be noted that all totals for these two years include both pollution and natural-caused fish kills. This was not the case in previous years, when only pollution-caused kills were considered. The numbers of pollution-caused fish kills were actually subaverage both years.

In the course of field investigations fish identification and enumeration is primarily the responsibility of KFG. KDHE is responsible for isolation and documentation of probable sources in instances where pollution is suspected. Both of these processes are expedited by prompt reporting of kill occurrences. Incomplete fish counts and undetermined causes are the results of late in-

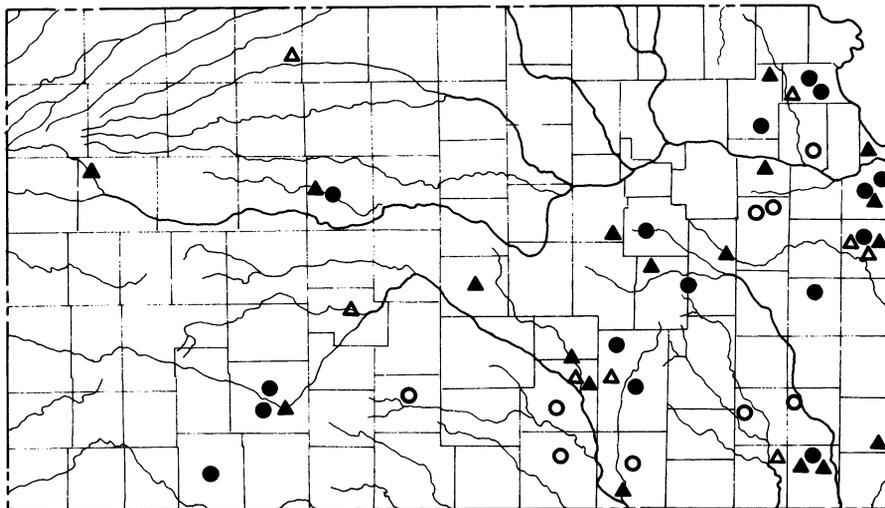


Fig. 1. ● pollution-caused fish kills, 1979; ○ natural-caused fish kills, 1979; ▲ pollution-caused fish kills, 1980; △ natural-caused fish kills, 1980.

vestigation. Necessarily, both agencies are reliant upon citizen observation and notification of fish kills. The source was not determined in 16 percent of the kills suspected to be caused by pollution in 1979–1980.

Fish kills caused by pollution did not follow the traditional pattern in 1979 (Haslouer, 1979:199). Agricultural operations, although tied for the most number of reports with, surprisingly, Transportation operations, caused few major kills. The number of kills caused by Industrial operations was commendably lower than average. Kills ascribed to Municipal operations were not significantly more numerous than in the past. The percentage of kills caused by pollution in 1979 (64 percent) was not notably different from 1978 (67 percent) or 1980 (69 percent).

Hot and dry conditions in 1980 contributed to another unusual year for fish kills. The number of kills attributed to Agricultural operations, due entirely to feedlot runoff in 1979–1980, declined substantially. Reports naming Transportation operations as the cause were uncharacteristically numerous for a second year. Industrial operations, on the other hand, were named in fewer reports for the second consecutive year. Although the number of kills caused by Municipal operations was not notably lower than usual, the number of fish killed in these incidents showed a dramatic decline.

The major difference in the 1980 reports, however, was the reversal in percentages of fish killed by natural events relative to pollution mortalities. High water temperatures and low water levels combined to cause two mas-

sive kills, Big Dutchman Reservoir and Pawnee Creek. More than 200,000 fish were killed in these two incidents alone, over four times the total from all pollution reports for 1980. In contrast, 67 percent of the mortalities from 1978 and 89 percent of those from 1979 were pollution caused.

#### BASIC STATISTICS

A total of 51 fish kills were reported from the years 1979–1980, 25 for 1979 and 26 for 1980 (Table 1). Nineteen of the reports from 1979 (76 percent) stated the number of fish killed. Counting only these reports, an estimated 66,883 fish were killed that year. Naturally it must be assumed that the actual figure was somewhat higher. 1980 was a much better year for numerical estimates. Twenty-four of the 1980 reports (92 percent) in-

Table 1. Fish kill summary by source of pollution, 1979–1980.

Source of pollution	Total reports		Reports specifying number of fish killed			
	1979	1980	# Reports		# Fish	
			1979	1980	1979	1980
<b>Agricultural</b>						
Manure drainage	5	2	3	2	5915	16,260
Subtotal	5	2	3	2	5915	16,260
<b>Industrial</b>						
Chemicals	1	1	1	—	6000	—
Petroleum	—	1	—	1	—	10,000
Subtotal	1	2	1	1	6000	10,000
<b>Municipal</b>						
Sewerage systems	1	3	1	3	2880	790
Water systems	1	—	1	—	500	—
Subtotal	2	3	2	3	3380	790
<b>Transportation</b>						
Rail	2	3	1	3	111	3779
Truck	—	3	—	3	—	10,842
Pipeline	3	—	2	—	40,710	—
Subtotal	5	6	3	6	40,821	14,611
Undetermined and other	3	5	2	5	3250	5681
Subtotal (pollution)	16	18	11	17	59,366	47,352
<b>Natural mortalities</b>						
Disease	3	2	2	1	3319	100
Summerkill	1	5	1	5	50	210,958
Winterkill	5	—	5	—	4148	—
Other	—	1	—	1	—	117
Subtotal (natural)	9	8	8	7	7517	211,175
<b>TOTAL</b>	<b>25</b>	<b>26</b>	<b>19</b>	<b>24</b>	<b>66,883</b>	<b>258,527</b>

Table 2. Fish kill summary by type of water body, 1979–1980.

Type of water body	Total reports		Number of fish killed		Area affected			
	1979	1980	1979	1980	Miles		Acres	
					1979	1980	1979	1980
River or stream	12	15	49,946	115,984	52.5	29.4		
Lake or pond	13	11	16,937	142,543			113.7	23.5

cluded estimates of the number of fish killed, a total of 258,527. Probable causes were identified in 22 of the 1979 reports (88 percent) and 23 of the reports from 1980 (81 percent).

In 1979, 16 of the incidents (64 percent) were caused by pollution. A similar percentage (69 percent, 18 incidents) of kills investigated in 1980 were pollution related. Of the 66,883 fish killed in 1979, 89 percent (59,366) were killed by pollution. In sharp contrast, the 47,352 fish killed by pollution in 1980 comprised only 18 percent of the total number of deaths.

In 1979 the number of fish killed exceeded 1000 on nine occasions and topped 10,000 in one incident (Jacob's Creek) which by itself accounted for 60 percent of the fish killed that year. 1980 was more disastrous as a year for major fish kills. One kill in excess of 100,000 fish, three more above 10,000 and seven additional kills of 1000–10,000 were reported from this

Table 3. Fish kill summary by month, 1979–1980.

Month	Total reports		Reports specifying number of fish killed			
	1979	1980	# Reports		# Fish	
			1979	1980	1979	1980
January	—	—	—	—	—	—
February	2	1	2	—	460	—
March	7	1	5	1	45,848	30
April	5	3	4	3	10,719	22,246
May	3	5	1	4	450	14,948
June	6	2	5	2	6026	1640
July	—	5	—	5	—	7425
August	2	2	2	2	3380	209,134
September	—	2	—	2	—	1704
October	—	3	—	3	—	1268
November	—	2	—	2	—	132
December	—	—	—	—	—	—
TOTAL	25	26	19	24	66,883	258,527

Table 4. Report of fish kills, 1979-1980.

Body of water	City or County	Date	Cause <sup>a</sup>	Type of fish killed		Estimated fish killed	Severity <sup>b</sup>	Estimated miles or acres affected <sup>c</sup>	Duration	
				Percent game	Percent non-game				Days	Hours
		1979								
Private Pond	Sedgwick Co.	2 02	62	—	—	250	—	—	—	—
Posey Creek	Cowley Co.	2 28	62	—	100	210	4	1.25 m	—	—
Private Pond	Fredonia	3 01	62	—	—	2000	3	0.75 a	—	—
Private Pond	Pratt	3 05	62	43	57	438	1	0.5 a	—	—
Reno Lake	Johnson Co.	3 16	70	—	—	—	—	—	—	—
Duck Creek	Dodge City	3 22	13	—	—	—	1	0.1 m	4	—
Jacob Creek	Lyon-Chase Co.	3 26	44	3	97	40,000	2	14 m	—	—
Neosho River	Parkerville	3 28	13	17	83	300	4	2.5 m	—	—
Arkansas River	Dodge City	3 29	50	2	98	3000	4	6 m	—	—
Constant Creek	El Dorado	4 08	44	8	92	600	3	1 m	1	—
Indian Creek	Kansas City	4 12	44	—	—	—	3	8 m	—	—
Elk's Lake	Chanute	4 16	62	—	100	1250	—	—	—	—
Private Pond	Parsons	4 16	24	—	—	6000	2	2.5 a	2	—
Hargis Creek Lake	Wellington	4 27	61	100	—	2869	4	67 a	2	—
Lake Dabanawa	Jefferson Co.	5 24	61	100	—	—	4	—	3	—
Spring Creek	Cummings	5 25	41	—	—	—	4	3.2 m	—	—
City Lake	Scranton	5 29	61	100	—	450	4	25 a	—	—
Crooked Creek	Meade	6 07	13	1	99	2615	2	3 m	2	—

Table 4. Continued.

Body of water	City or County	Date	Cause <sup>a</sup>	Type of fish killed		Estimated fish killed	Severity <sup>b</sup>	Estimated miles or acres affected <sup>c</sup>	Duration	
				Percent game	Percent non-game				Days	Hours
Big Creek	Yocemento	6 07	13	1	99	3000	2	4.5 m	2	—
Private Pond	Paola	6 14	70	100	—	250	4	1 a	1	—
Private Pond	Carbondale	6 16	63	100	—	50	4	1 a	1	—
Stranger Creek	Cummings	6 19	41	7	93	111	3	4 m	1	—
Gillion Creek	Potwin	6 27	13	—	—	—	2	5 m	3	—
Private Pond	Hoyt	8 11	31	1	99	2880	2	2 a	3	—
Crystal Lake	Garnett	8 22	33	—	—	500	4	14 a	2	—
		1980								
Private Pond	Parsons	2 19	24	—	—	—	2	3 a	—	—
Shunganunga Creek	Topeka	3 22	42	—	100	30	4	1 m	—	12
Private Pond	Whiting	4 03	13	100	—	12,000	1	—	2	—
Cedar Creek & Lake	Olathe	4 05	42	100	—	9412	3	0.75 m	4	—
Private Pond	Pittsburg	4 21	41	20	80	934	3	3 a	—	—
Zoo Ponds	Wichita	5 03	61	100	—	—	2	—	—	—
Little Labette Cr.	Parsons	5 07	70	—	—	13	4	—	—	—
Private Pond	Paola	5 15	70	100	—	675	4	8 a	—	—
Arkansas River	Ford	5 18	13	9	91	4260	3	10 m	1	12
Chisholm Creek	Wichita	5 28	25	12	88	10,000	2	0.6 m	1	—
Marais Des Cygnes	Reading	6 26	41	2	98	240	4	0.1 m	—	3
N. Fork Smoky Hill	Winona	6 26	42	25	75	1400	2	2.5 m	—	—

Table 4. Continued.

Body of water	City or County	Date	Cause <sup>a</sup>	Type of fish killed		Estimated fish killed	Severity <sup>b</sup>	Estimated miles or acres affected <sup>c</sup>		Duration	
				Percent game	Percent non-game			Days	Hours		
Private Pond	Edwardsville	7 02	50	100	—	1500	2	1 a	3	—	—
Delaware River	Arrington	7 10	63/64	15	85	120	4	1.8 m	1	—	—
Little Ark. River	Sedgwick	7 18	70	—	—	2500	2	1 m	—	—	—
Diamond Creek	Hymar	7 20	41	8	92	2705	2	0.1 m	1	—	—
Big Creek	Ellis	7 26	31	—	100	600	3	1.5 m	—	—	—
Big Dutchman Res.	Norton	8 01	63/64	3	97	125,730	2	7 a	2	12	—
Pawnee Creek	Larned	8 15	63/64	1	99	83,404	2	3 m	4	—	—
Private Pond	Paola	9 01	63	98	2	204	2	0.5 a	—	—	—
Private Pond	Oswatomic	9 20	63	—	—	1500	2	0.5 a	—	—	—
Private Pond	Cherryvale	10 09	61	100	—	100	3	0.5 a	14	—	—
Cow Creek	Lyons	10 10	31	—	—	175	3	0.5 m	1	—	—
Walnut River	Arkansas City	10 15	70	1	99	993	3	1.5 m	—	18	—
Whitewater River	Towanda	11 21	64	33	67	117	4	5 m	2	12	—
Clear Creek	Herrington	11 28	31/64	—	—	15	—	—	—	—	—

<sup>a</sup> CAUSE: 10—Agricultural operations; 11—Pesticides (herbicides, insecticides, etc.); 12—Fertilizers; 13—Manure, silo, feedlot drainage, etc. 20—Industrial operations; 21—Mining; 22—Food & kindred products; 23—Paper & allied products; 24—Chemicals; 25—Petroleum; 26—Metals; 27—Combinations; 28—Other; 30—Municipal operations; 31—Sewerage system; 32—Refuse disposal; 33—Water system; 34—Swimming pool; 35—Power; 40—Transportation; 41—Rail; 42—Truck; 43—Barge or boat; 44—Pipeline; 50—Other operations; 60—Natural causes; 61—Disease; 62—Wintertkill; 63—Summerkill; 64—Low water conditions; 70—Cause unknown.

<sup>b</sup> SEVERITY: 1—Complete; 2—Heavy; 3—Moderate; 4—Light.

<sup>c</sup> ESTIMATED MILES OR ACRES AFFECTED. a = acres, m = miles.

year. The largest fish kill (Big Dutchman Reservoir) was responsible for nearly half (49 percent) of the mortalities in 1980.

Seventy-five percent (49,946) of the fish killed in 1979 were in rivers or streams (Table 2). The remaining 25 percent (16,937) died in lakes or ponds. In 1980, 45 percent (115,984) of the fish killed were in rivers or streams. The remaining 142,543 deaths were from impounded waters.

The majority of fish kills in 1979 (68 percent) occurred from February to May, the spring months of higher rainfall runoff (Table 3). In 1980 most of the reports were from the hot and dry summer months, proceeding through the dry autumn.

A comprehensive listing of fish kills from 1979–1980 identifying the cause, number of fish killed, and area affected is presented in Table 4.

#### ACKNOWLEDGMENTS

Once again I would like to thank the field staffs of KDHE and KFG for their diligent assistance in investigating the incidents described.

#### LITERATURE CITED

- Anonymous. 1979. Fish kills caused by pollution, fifteen-year summary: 1961–1975. United States Environmental Protection Agency. 78 pp.
- Haslouer, Stephen G. 1971. Natural and pollution-caused fish kills in Kansas during 1978. *Trans. Kans. Acad. Sci.* 82(4):197–204.