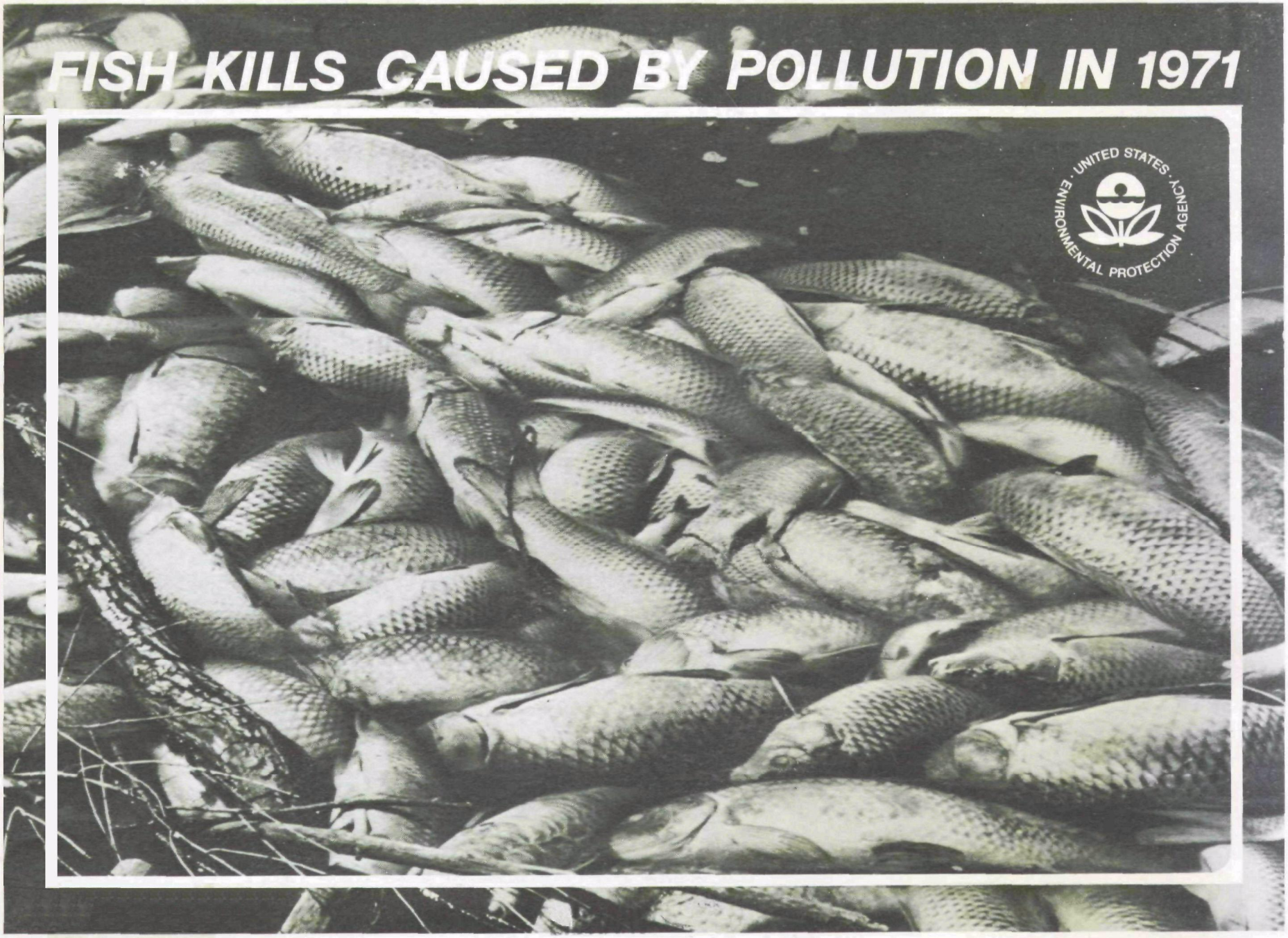
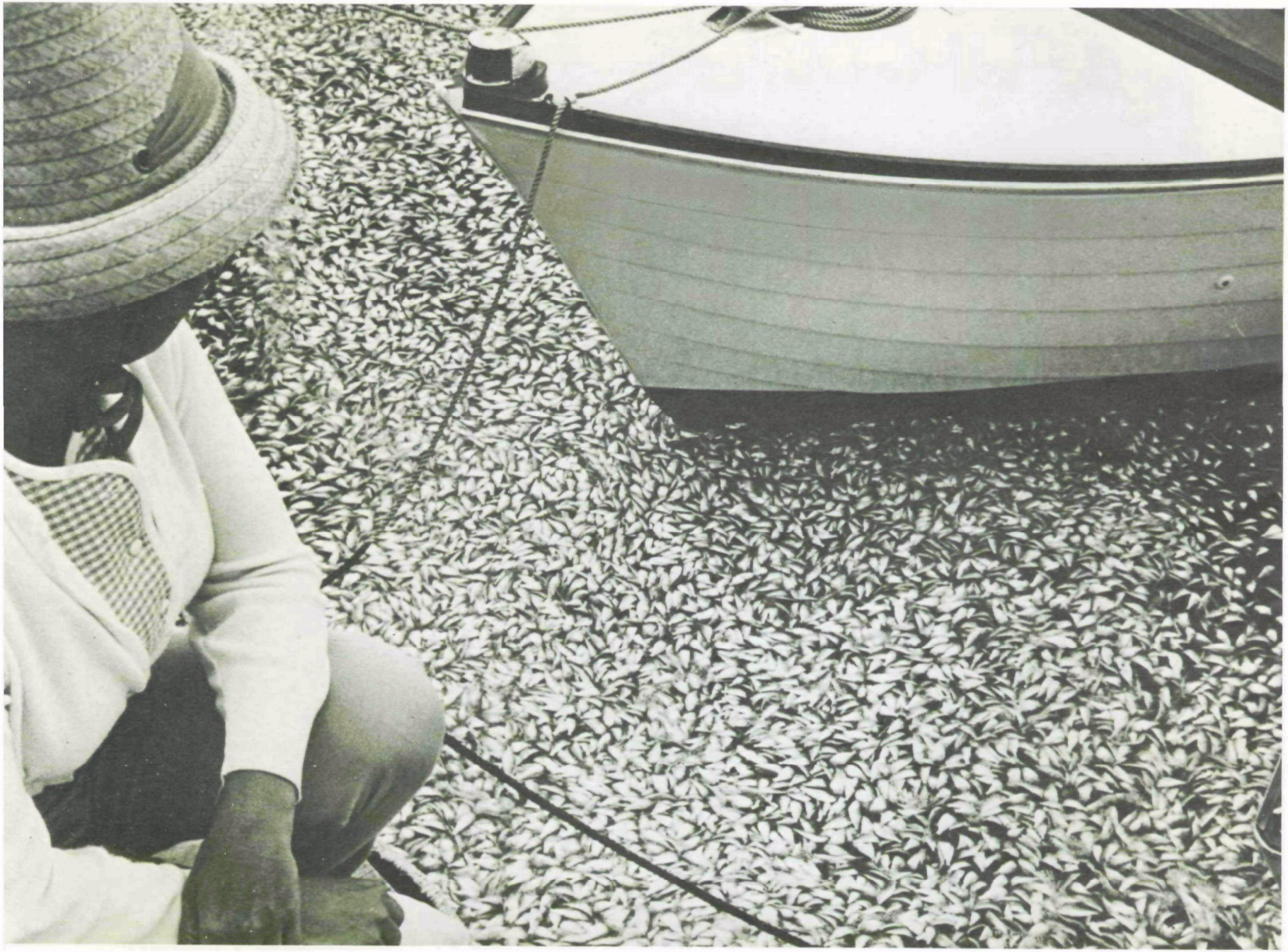
FISH KILLS CAUSED BY POLLUTION IN 1971





1971 FISH KILLS · TWELFTH ANNUAL REPORT

OFFICE OF AIR AND WATER PROGRAMS

MONITORING AND DATA SUPPORT DIVISION
DATA REPORTING BRANCH
WASHINGTON, D.C. 20460

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Contents . . .

Foreword . . .

The annual fish kill report represents the combined efforts of private individuals; State fish and game, health, and conservation officers; and water pollution control officials at the State and Federal level. Usually, a fish kill is first noticed by a fisherman, camper, or other private citizen, who initiates the reporting process by contacting a warden or other State official. The State agency then sends trained specialists to investigate and identify the cause and size of the kill. Where water pollution is determined or suspected to be the cause, the State submits a report to the Environmental Protection Agency

The annual fish kill report cannot be considered complete, since numerous kills go unnoticed or unreported.

At this time, it is appropriate to recognize the dedication and effort devoted to the annual fish kill report by Mr. James R. Harlan, Conservationist, who retired recently from the Office of Air and Water Programs, Environmental Protection Agency. His significant contributions to the report extend from its inception in 1960 through this current publication.

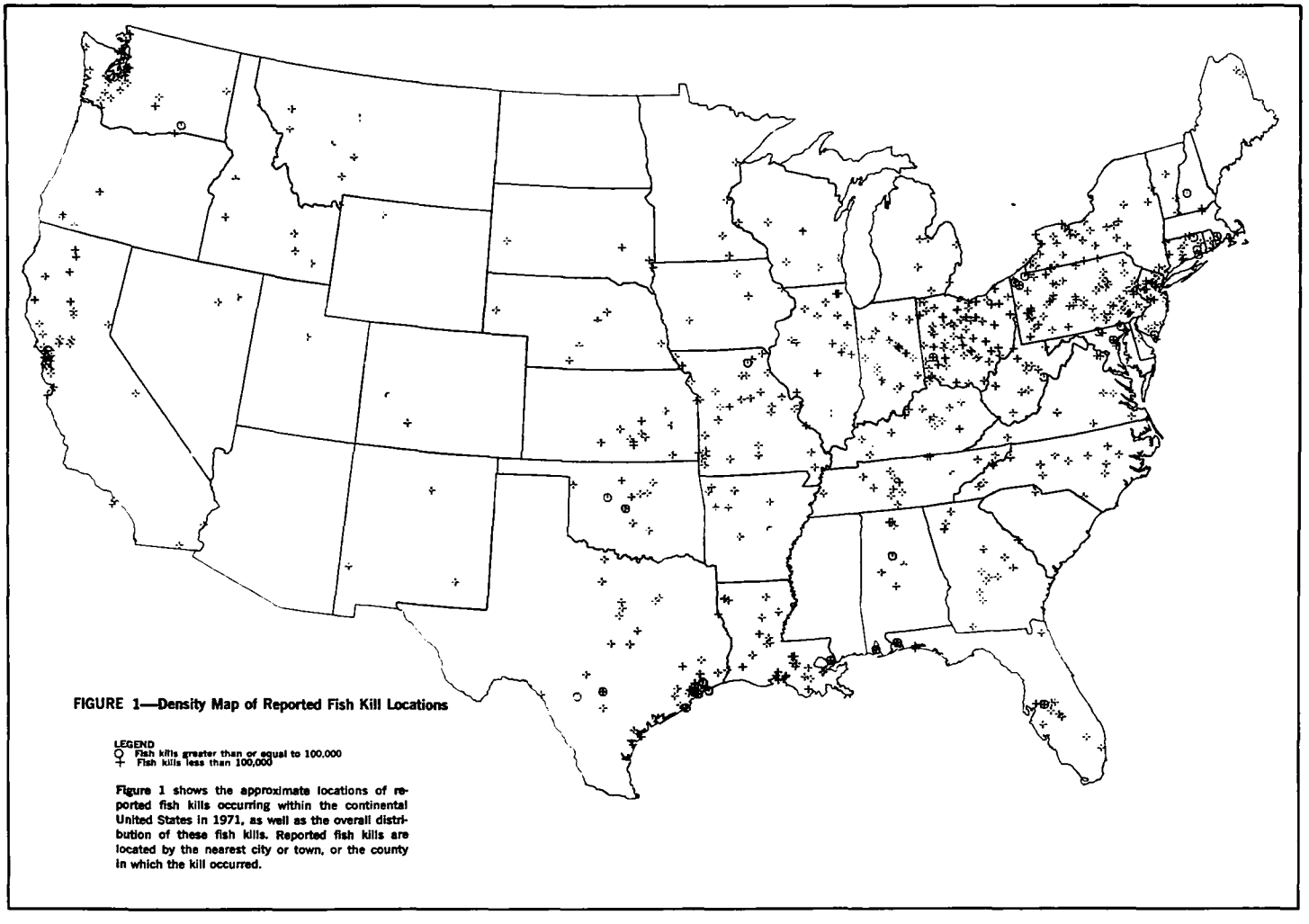


FIGURE 1—Density Map of Reported Fish Kill Locations

LEGEND
Fish kills greater than or equal to 100,000
Fish kills less than 100,000

Figure 1 shows the approximate locations of reported fish kills occurring within the continental United States in 1971, as well as the overall distribution of these fish kills. Reported fish kills are located by the nearest city or town, or the county in which the kill occurred.

Summary

Significant Statistics of Fish Kills Reported in 1971

- **73.7 Million Fish Reported Killed by Pollution in 1971!**
  The number of fish reported killed by pollution in 1971 is greater by 81 percent than the number reported in any previous year on record (beginning 1960). The second largest number was reported in 1969, when the toll was 41 million. The data do not indicate whether this is due to better reporting by a concerned public or to greater fish kills.
- **One Million or More Fish Reported Killed by Pollution in Each of 28 Incidents in 1971!**
  The number of fish kills reported in 1971 which involved the death of one million or more fish almost equals the total number of kills of this size (31) reported from June 1960 through 1970.
- **860 Reports of Pollution-Caused Fish Kills in 1971 Tops Previous Annual High (1970) by 226 Reports!**
  The number of reports continues to increase annually at a rate indicated by the doubling in 1971 of the number received in 1967.
- **659 Pollution-Caused Fish Kill Incidents in 1971 Occurred in the Eastern Half of the Continental United States!**
  Of the 820 reported fish kills in the continental United States, 659, or 79 percent, occurred east of the boundaries of Texas, Oklahoma, Kansas, Nebraska, and the Dakotas.
- **56.4 Million Fish Were Killed in Estuarine Waters in 1971!**
  For the first time since the annual report was started in 1960, more fish were reported killed in estuarine waters than in fresh or salt water. The large number killed in 1971 is primarily due to a number of large kills totaling 31.4 million fish which were reported in two localized bay areas, one in Florida and one in Texas.
- **24.8 Million Fish Reported Killed by Pollution From Municipal Operations in 1971!**
  Pollution from municipal sources, principally sewerage systems, caused, for the third time in the history of the report, the death of more fish than any other major source of pollution. In 1971, industrial operations led all other major sources of pollution in reported incidents (231) for the twelfth consecutive year.
- **63.7 Million Fish Were Reported Killed by Pollution from May through September, 1971!**
  The warm weather months May through September accounted for 71.2 percent of the total reported pollution-caused fish kill incidents in 1971. The 147 kills occurring in July is the highest number reported for any month since the inception of the annual fish kill report.

Detailed Analyses of 1971 Reports

Basic Statistics

A density map of reported 1971 fish kill incidents in the continental United States (Figure 1) shows the distribution throughout the country.

The total of 860 reports in 1971 (Table 1) shows a 36 percent increase over 1970. It is impossible to say whether this represents a true increase in the number of incidents or whether it results from increased awareness and interest of the many people, starting with the casual observer, involved in the reporting chain.

Sources of pollution were identified in 641 of the 860 reported incidents. These kills are listed individually in Table 10. The 219 kills for which the source could not be identified are listed in Table 11.

Total Fish Reported Killed

Of the 860 reports submitted, 757 contained estimates of the number of fish killed (Table 2). In the remaining 103 reports, fish losses were expressed in general terms such as thousands or pounds. These 103 reports were assigned values based on averages

Table 1 contains historical data for the twelve years that the annual fish kill report has been published. The table summarizes the number of estimated fish killed, the number of states reporting fish kills, the number of reports indicating size of fish kill, and other supporting information.

TABLE 1—Historical Summary of Pollution-Caused Fish Kills, June 1960—December 1971

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Number of States reporting	38	45	37	38	40	44	46	40	42	45	45	46
Number of reports	286	411	381	436	485	531	436	375	438	465	634	860
Reports which state number of fish killed	149	263	233	300	385	446	372	303	379	382	560	757
Total estimated number of fish killed [1]	6,379,000	15,910,000	7,118,000	7,860,000	18,387,000	11,784,000	9,115,000	11,591,000	15,236,000	41,004,000	22,760,000	74,287,000
Average size of kill [2]	2,925	6,535	5,710	7,775	5,490	4,310	5,620	6,460	6,015	5,860	6,412	6,154
Largest kill reported	5,000,000	5,387,000	3,180,000	2,000,000	7,887,000	3,000,000	1,000,000	6,549,000	4,029,000	26,527,000	3,240,000	5,500,000
Reports where extent of area affected was stated												
River:												
Number of reports	189	240	259	271	339	292	251	219	264	356	487	705
Miles of stream	1,204	1,686	1,448	2,203	1,440	1,300	989	1,039	1,565	2,358	1,865	4,187
Lakes and reservoirs:												
Number of reports	25	50	25	49	57	38	46	33	37	98	111	94
Acres affected	1,407	5,967	2,581	5,644	12,637	4,630	21,564	1,996	2,400	6,068	33,168	6,622
Coastal waters: [4]												
Number of reports	13	6	9	5	6	9	4	1	6	11	36	61
Miles of coastal waters	51	51	25	7	11	20	16	3	28	113	11,687 [5]	2,034
Average duration of kill in days	**2.95**	**2.64**	**2.59**	**3.18**	**2.44**	**2.57**	**2.71**	**3.34**	**2.99**	**3.11**	**3.25**	**3.35**

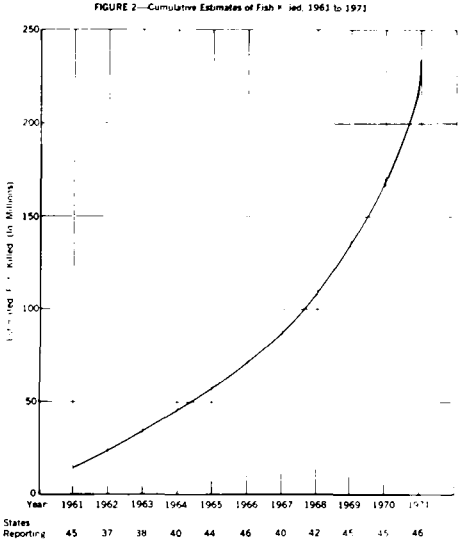
[1] Includes all fish killed reported plus an allowance computed for reports which do not indicate the number of fish that died.
[2] After adjustment for reports giving two or more causes.
[3] Derived after excluding reports of 100,000 kills or more as being unrepresentative.
[4] Includes embayments such as Chesapeake, San Francisco, and Galveston Bays.
[5] Two incidents off Alaska affected 11,520 acres of coastal waters.

from 703 fish kill reports in which less than 100,000 fish were reported killed. The total of the 757 reports containing fish kill estimates, plus the computed fish kill estimates for the 103 reports brought the 1971 fish kill estimate total to 74,286,923.

The 74.3 million fish estimated killed brought the total number of fish killed (Figure 2) to 235.0 million in 5,452 separate incidents since the first full year of reporting (1961). There were 46 States which submitted at least one fish kill report. The remaining four States—Alaska, Arizona, Mississippi, and North Dakota—did not submit any reports. Massive kills in Florida and Texas (Table 3) accounted for more than 65 percent (47.9 million) of the total number of fish reported killed in 1971.

Major Fish Kills

There were 54 reported kills in which the number of dead fish equaled or exceeded 100,000 each, accounting for 69.4 million fish (Table 4). Of these, 28 kills reached or exceeded the million mark. One million or more fish were killed in: twelve incidents in Florida, totalling 29,000,000 fish; six incidents in Texas, totalling 16,000,000 fish; three incidents in Alabama, totalling 5,500,000 fish; one incident in Washington, killing 5,000,000 fish; two incidents in Connecticut, totalling 3,000,000 fish; one incident in New Jersey, killing 2,000,000 fish; one incident in Maryland and one incident in Massachusetts, killing 1,250,000 fish each; and one incident in Louisiana, killing 1,000,000 fish.



AN INCREASING RATE OF REPORTED FISH KILLS . . .

. . . over an 11 year period is indicated by Figure 2. This graph is a cumulative summary of estimated numbers of fish killed reported for 1961 through 1971. The first reporting year, 1960, was excluded since reports were not received for the full year.

Average Size of Fish Kills

The average size of the 1971 fish kills was 6,154, down from the 1970 average size of 6,412 (Table 2). As in previous annual reports, averages were derived after eliminating as unrepresentative those reports of 100,000 or more fish killed (Table 4). Hence, while the total estimated fish killed for 1971 was 226 percent greater than the 1970 total, the 1971 average fish kill was 4 percent less than the 1970 average. The 1971 average is obviously a skewed statistic since the number of reports of fish kills exceeding 100,000 amount to only 6 percent of the total reports but account for more than 94 percent of the total fish killed.

Kills caused by transportation operations had the highest average, with 10,106 fish per kill reported, followed by 7,382 fish per kill for industrial operations, 6,068 fish per kill for municipal operations, and 4,714 fish per kill for agricultural operations (Table 2). These averages were also computed excluding kills greater than or equal to 100,000 from the base.

Fish Killed, By Type of Water Body

The 1971 reports indicate a significant decrease in fish reported killed in lakes and a significant increase in fish reported killed in coastal waters including bays such as Chesapeake, San Francisco and Galveston Bays. Only one percent (0.8 million) of the total fish reported killed (Table 5) died in lakes, while 44 percent (32.4 million) died in coastal waters. In 1970, 14 percent (3.1 million) of the total died in lakes, while 27 percent (6.1 million) died in coastal waters. Fish killed in rivers and streams varied slightly between 55 percent (40.4 million) in 1971 and 59 percent (13.1 million) in 1970.

Fish Killed, By Type of Water

In 1971, the number of fish reported

TABLE 2—Fish Kill Summary by Source of Pollution, 1971

Source of pollution	Total reports	Reports specifying number of fish killed		Average kill*	Estimated fish killed**		
		No. of reports	No. of fish		Total	Game	Non-game
Agricultural:							
Pesticides	75	63	264,504				
Fertilizers	11	8	65,760				
Manure-silage drainage	46	41	693,073				
Subtotal	132	112	1,023,337	4,714	1,117,617	354,284	763,333
Industrial:							
Mining	30	25	220,758				
Food products	25	20	72,037				
Paper products	10	8	45,805				
Chemicals	49	47	2,400,060				
Petroleum	29	22	230,900				
Metals	24	22	284,604				
Combinations	9	9	1,119,877				
Other	55	46	278,351				
Subtotal	231	199	4,652,392	7,382	4,888,616	645,297	4,243,319
Municipal:							
Sewerage systems	133	111	21,352,390				
Refuse disposal	5	3	81,202				
Water systems	12	11	86,334				
Swimming pool	3	3	930				
Power	9	9	3,277,576				
Subtotal	162	137	24,798,432	6,068	24,950,132	2,420,162	22,529,970
Transportation:							
Rail	13	12	210,693				
Truck	30	28	441,157				
Barge or boat	1	1	7,500				
Pipeline	8	7	4,830				
Subtotal	52	48	664,180	10,106	704,604	172,627	531,977
Other operations:	64	60	7,257,478	2,464	7,267,334	5,297,886	1,969,448
Unknown:	219	201	35,257,226	5,633	35,358,620	141,434	35,217,186
Total:	860	757	73,653,045	6,154	74,286,923	9,031,690	65,255,233

* Derived after excluding 54 reports of 100,000 kills or more as being unrepresentative.
** Includes all fish killed plus an allowance computed for reports which did not indicate the number of fish that died.
Note: Insufficient data available to make a reliable estimate of the number of fish of commercial value that died.

killed in estuary-type water (water of inlets, bays, or river mouths that are affected by tidal action) increased considerably over the number reported killed in 1970.

In 1971, 77 percent (56.4 million) of the total reported fish were killed in estuary-type water (Table 6) as compared to 44 percent (9.8 million) in 1970; about 20 percent of the fish (15.2 million) were killed in fresh water (inland water upstream of tidal action) as compared to 54 percent (12.0 million) in 1970, showing a significant decrease; and 3 percent of the fish (2.0 million) were killed in salt water (water beyond the coastline) as compared to 2 percent (0.5 million) in 1970.

The increase of fish killed in estuary-type water could be of great national concern since estuaries serve as nursery grounds for many species of marine fish. In this report, however, the large increase over the previous year results from a number of massive kills localized principally in the Escambia Bay, Florida, and the Galveston Bay, Texas, areas. Interpretation as a national trend, therefore, is not in order.

Fish Kills, By Month

As in the past, the greatest number of fish kills occurred during the summer months (Table 7). Warm water and low river stages from May through September enhanced the

Table 2 summarizes 1971 fish kills by major and individual pollution sources, and provides further information on fish killed in the game and non-game categories by major pollutional sources. Average size of fish kill for each major source is also included.

pollutional effect by increasing pollutant concentrations through lower water stages, or decreasing dissolved oxygen due to increased water temperature. Almost 86 percent of the 73.6 million fish reported killed in 1971 were killed from May through September. July had the greatest number of fish kill reports (147) with almost 18 million fish killed, based on 134 reports which specified the number of fish killed. August ranked second in number of fish kill reports (145), but showed the greatest loss for a single month with 20.5 million fish based on 130 reports giving the number killed. September ranked third in number of fish kill reports (136) with 19.6 million fish killed based on 122 reports giving the number killed. June ranked fourth in number of fish kill reports (108) with 4.1 million fish killed based on 95 reports giving the number killed. May ranked fifth in number of fish kill reports (76) with 1.6 million fish killed based on 64 reports giving the number killed.

Fish Kills, By Duration

All reports do not indicate duration of kill. In 1971, 58 percent (503 reports) indicated duration of kill with an average of 3.35 days (Table 1). In 1970, 84 percent

TABLE 3—Pollution-Caused Fish Kill Summary by State, 1971

State	Total reports	Reports specifying number of fish killed		Number of reports and water surfaces affected					
				River		Lake		Coastal waters*	
		Number of reports	Number of fish	Number of reports	Number of miles	Number of reports	Number of acres	Number of reports	Number of miles
Alabama	20	20	6,012,387	13	65	7	30		
Arkansas	9	8	111,504	9	30				
California	39	37	72,605	29	68	5	1,532	5	60
Colorado	3	3	41,600	3	15				
Connecticut	13	12	3,133,900	12	24			1	
Delaware	1	1	1,250	1	1				
Florida	62	60	31,676,761	9	420	9	1,186	44	949
Georgia	16	15	56,000	10	50	6	32		
Hawaii	12	11	18,090	8	7	2	2	2	2
Idaho	6	5	18,012	4	10	2	11		
Illinois	18	17	408,999	17	90	1	4		
Indiana	24	20	33,021	24	104				
Iowa	6	6	125,000	5	28	1	5		
Kansas	13	13	53,335	11	26	2			
Kentucky	15	10	61,590	15	48				
Louisiana	50	42	1,191,630	44	191	5	215	1	1,000
Maine	2	1	400	2	1				
Maryland	12	10	1,582,826	9	799	1	10	2	2
Massachusetts	5	4	1,255,902	2	3	3	9		
Michigan	6	5	59,375	6	11				
Minnesota	5	5	16,350	5	15				
Missouri	37	29	555,789	34	131	3	8		
Montana	7	3	9,280	7	15				
Nebraska	6	5	11,645	4	23	2	2		
Nevada	2	1	15,000	2	10				
New Hampshire	3	2	105,000	2	4	1	182		
New Jersey	28	25	2,016,475	15	19	13	48		
New Mexico	3	3	9,250	3	43				
New York	38	38	242,935	37	92	1	1		
North Carolina	16	14	78,262	15	757	1	6		
Ohio	134	107	1,248,351	132		2			
Oklahoma	11	11	490,345	10	193	1	3,200		
Oregon	4	4	1,386	4	5				
Pennsylvania	81	78	1,091,434	78	255	3	32		
Rhode Island	2	2	300	1	1	1			
South Carolina	1			1	12				
South Dakota	3	3	10,300	2	6	1	10		
Tennessee	18	18	277,625	16	31	2	4		
Texas	59	52	16,216,075	47	358	8	27	4	15
Utah	1	1	110	1					
Vermont	4	4	40,500	4	9				
Virginia	11	8	47,141	7	33	4	24		
Washington	31	22	5,026,721	24	103	5	9	2	6
West Virginia	13	13	210,054	12	51	1	3		
Wisconsin	9	8	6,530	8	27	1	30		
Wyoming	1	1	12,000	1	3				
Total	**860**	**757**	**73,653,045**	**705**	**4,187**	**94**	**6,622**	**61**	**2,034**

* Includes embayments such as Chesapeake, San Francisco, and Galveston Bays.

Table 3 summarizes fish kills in 46 reporting States. Of the 860 reports, 757 indicated the number of fish killed. The remaining 103 reports estimated losses in such general terms as "thousands of fish" and "pounds." This table also shows a state-by-state breakdown of the number of fish reported killed and water surfaces affected.

TABLE 4—Major Kills—100,000 or Over—1971

Lake or stream	Near or in	State	Number of fish	Operation
Locust Fork	Birmingport	Alabama	1,000,000	Combination
Valley Creek	Gilmore	Alabama	2,500,000	Sewerage system
Eslava Cr-Dog R	Mobile	Alabama	2,030,035	Sewerage system
Industrial Canal	Mobile	Alabama	403,780	Sewerage System
Thames River	Montville	Connecticut	100,000	Unknown
Thames River	Norwich	Connecticut	1,000,000	Sewerage System
Millstone Point	Waterford	Connecticut	2,000,000	Power
Banana Lake	Lakeland	Florida	273,100	Sewerage System
Bass Hole Cove	Santa Rosa Co	Florida	3,000,000	Unknown
Bass Hole Cove	Santa Rosa Co	Florida	2,000,000	Unknown
E Shore-Escambia	Santa Rosa Co	Florida	5,500,000	Unknown
Escambia Bay	Santa Rosa Co	Florida	150,000	Unknown
Escambia Bay	Santa Rosa Co	Florida	250,000	Unknown
Escambia River	Santa Rosa Co	Florida	250,000	Unknown
Judges Bayou	Santa Rosa Co	Florida	2,000,000	Unknown
Judges Bayou	Santa Rosa Co	Florida	500,000	Unknown
Judges Bayou	Santa Rosa Co	Florida	2,500,000	Unknown
Judges Bayou-ESC	Santa Rosa Co	Florida	2,000,000	Unknown
Judges Bayou-ESC	Santa Rosa Co	Florida	2,000,000	Unknown
Mulatto Bayou	Santa Rosa Co	Florida	2,000,000	Unknown
Mulatto Bayou	Santa Rosa Co	Florida	2,000,000	Unknown
Mulatto Bayou	Santa Rosa Co	Florida	250,000	Unknown
Mulatto Bayou-CA	Santa Rosa Co	Florida	2,000,000	Unknown
N Escambia Bay	Santa Rosa Co	Florida	2,000,000	Unknown
Saltzman Bayou	Santa Rosa Co	Florida	750,000	Unknown
Saltzman Bayou	Santa Rosa Co	Florida	2,000,000	Unknown
Salt Bayou	Slidell	Louisiana	1,000,000	Sewerage system
Bear Creek	Baltimore	Maryland	177,550	Metals
Susquehanna Riv	Conowingo	Maryland	1,253,516	Power
Piney Run	Taneytown	Maryland	113,000	Sewerage System
Lee River	Somerset	Massachusetts	1,222,800	Chemicals
N Fk Salt River	Brashear	Missouri	152,752	Sewerage system
Kezar Lake	North Sutton	New Hampshire	100,000	Sewerage system
Bidwells Ditch	Goshen	New Jersey	2,000,000	Other operations
Maumee R	Lucas Co	Ohio	131,245	Sewerage system
Great Miami R	Montgomery Co	Ohio	548,076	Sewerage system
N Canadian R	Oklahoma City	Oklahoma	171,370	Chemicals
N Canadian R	Watonga	Oklahoma	132,769	Sewerage system
Conneaut Creek	Conneautville	Pennsylvania	100,000	Chemicals
French Creek	Meadville	Pennsylvania	350,000	Chemicals
So Br French Cr	Union City	Pennsylvania	189,166	Truck transportation
Oyster Bayou	Anahuac	Texas	1,993,200	Unknown
Trinity River	Anahuac	Texas	3,000,000	Sewerage system
Dickinson Bayou	Dickinson	Texas	2,000,000	Sewerage system
Dickinson Bayou	Dickinson	Texas	3,000,000	Sewerage system
Dickinson Bayou	Dickinson	Texas	4,000,000	Sewerage System
Freeport Harbor	Freeport	Texas	105,600	Other operations
Sun Oil "Slip"	Gilcrist	Texas	1,000,000	Unknown
Sabinal River	Sabinal	Texas	500,000	Manure drainage
San Antonio Riv	San Antonio	Texas	100,000	Chemicals
Taylor Bayou	Shoreacres	Texas	300,000	Sewerage system
Drainage Canal	Texas City	Texas	150,000	Sewerage system
Snake River	Pasco	Washington	5,011,400	Other operations
Greenbrier River	Durbin	West Virginia	120,547	Other industrial

(408 reports) indicated duration with an average of 3.25 days (Table 1). The four longest lasting pollution incidents in 1971 required at least 99 days for all fish to be killed. These incidents occurred at: Millstone Point near Waterford, Connecticut; Beaver Creek near Bellingham, Washington; Snake River near Pascoe, Washington; and Beaver Creek near Ryderwood, Washington.

Table 4 summarizes those fish kill incidents in which 100,000 or more fish were killed in 1971.

Table 5 summarizes fish kills by type of water body (river, lake, and coastal waters); Table 6 summarizes fish kills by type of water, (fresh, salt, and estuary); and Table 7 summarizes fish kills by month.

TABLE 5—Fish Kill Summary by Type of Water Body, 1971

Type of water body	Total reports	Reports specifying number of fish killed	
		Number of reports	Number of fish
River	705	610	40,418,471
Lake	94	90	822,210
Coastal waters*	61	57	32,412,364
Total	860	757	73,653,045

* Includes embayments such as Chesapeake, San Francisco, and Galveston Bays.

TABLE 6—Fish Kill Summary by Type of Water, 1971

Type of water	Total reports	Reports specifying number of fish killed	
		Number of reports	Number of fish
Fresh*	725	630	15,205,913
Salt**	11	7	2,014,914
Estuary***	124	120	56,432,218
Total	**860**	**757**	**73,653,045**

* Fresh water includes any inland water upstream of tidal action.

** Salt water means water beyond the coastline.

*** Estuary means the water of inlets, bays, or river mouths that are affected by tidal action.

TABLE 7—Fish Kill Summary by Month, 1971

Month	Total reports	Reports specifying number of fish killed	
		Number of reports	Number of fish
January	24	19	263,838
February	28	25	111,277
March	38	30	399,957
April	54	46	5,279,224
May	76	64	1,576,873
June	108	95	4,111,714
July	147	134	17,854,512
August	145	130	20,524,479
September	136	122	19,607,229
October	56	51	3,586,161
November	24	22	161,149
December	24	19	176,632
Total	**860**	**757**	**73,653,045**

Fish Kills, By Severity

Measurements of fish kill severity are reported as complete, heavy, moderate, or light (Table 8). One hundred and seven reports of complete kills were reported, averaging 9,426 fish per kill. Heavy kills averaging 9,583 fish were reported on 269 occasions. Moderate kills were reported on 144 occasions, averaging 4,046 fish per kill. Light kills were reported on 160 occasions, averaging 1,082 fish per kill. Table 8 also indicates the average duration of fish kills by severity of kill, as well as the number and percentages of fish kill reports given jointly for severity of kill and major source of pollution.

Table 8 summarizes severity of a fish kill by the number of reports, average size of fish kill, duration of fish kill, and major pollution source operations. In 1971, "heavy" kills occurred most frequently (269 reports), with an average fish kill size of 9,583 and an average duration of 4.44 days based on 199 reports.

TABLE 8—Fish Kill Summary by Severity of Kill, 1971

Severity of kill	Number of reports	Average kill*	Duration of kill		Agricultural		Industrial		Municipal		Transportation		Other Operations		Unknown	
			No.	Average (days)	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Complete kill	107	9,426	78	1.79	26	19.0	40	17.0	10	6.0	11	21.0	10	15.0	10	4.0
Heavy kill	269	9,583	199	4.44	38	28.0	69	29.0	59	36.0	19	36.0	17	26.0	67	30.0
Moderate kill	144	4,046	103	2.34	23	17.0	27	11.0	30	18.0	9	17.0	11	17.0	44	20.0
Light kill	160	1,082	106	2.58	16	12.0	43	18.0	20	12.0	6	11.0	18	28.0	57	26.0
Not Stated	180	7,348	17	8.65	29	22.0	52	22.0	43	26.0	7	13.0	8	12.0	41	18.0
Total	**860**	**6,154**	**503**	**3.35**	**132**	**100.0**	**231**	**100.0**	**162**	**100.0**	**52**	**100.0**	**64**	**100.0**	**219**	**100.0**

* Derived after excluding 54 reports of 100,000 kills or more as being unrepresentative.

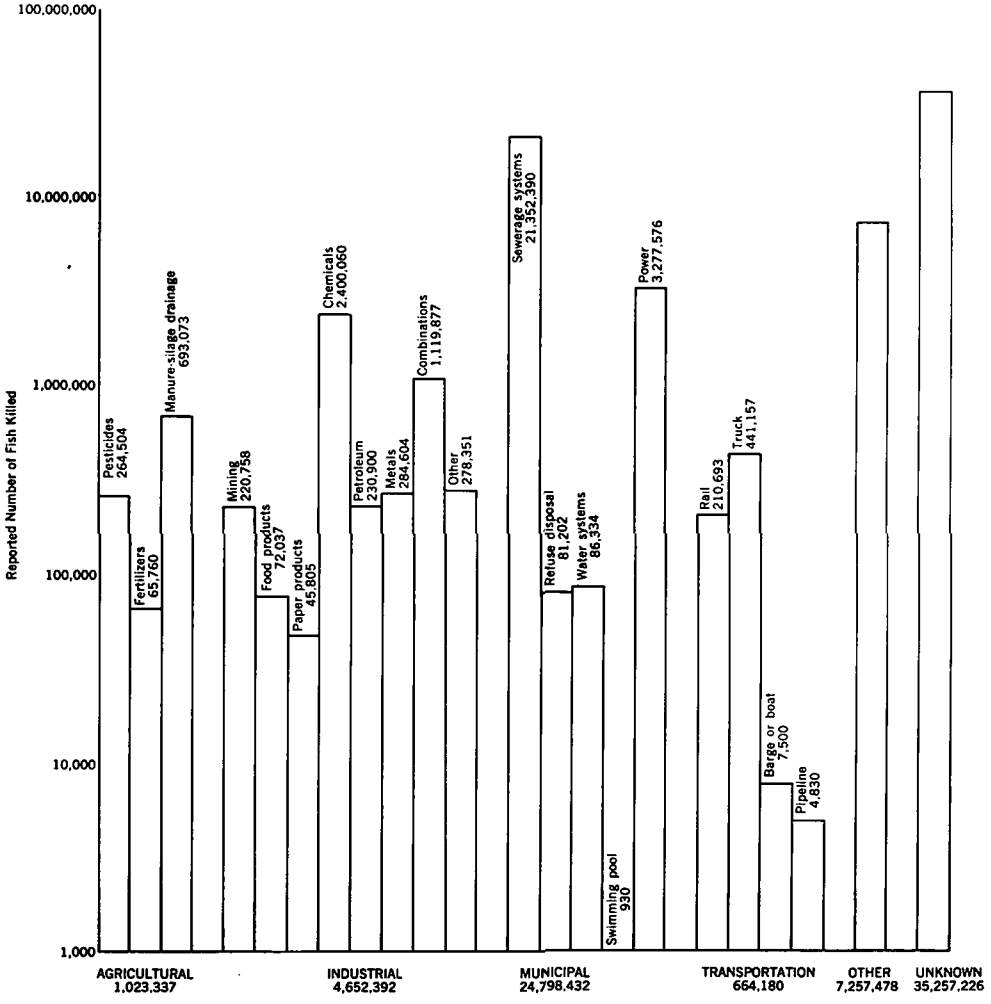
Analyses of Pollution–Causing Operations—National Basis

Industrial operations continued to be the most frequent cause of fish kills (Table 2), with 231 reports accounting for 4.9 million fish killed. Pollution from municipal operations was the second most frequent cause, with 162 reports accounting for 25.0 million fish.

In 1971, the number of fish killed by pollution from sewerage systems (21.4 million) led all other individual sources of pollution (Figure 3). The number of reported incidents resulting from pollution from sewerage systems (133) also led all other identifiable sources of pollution (Figure 4). Data from the reported number of fish killed and the number of fish kill reports are not randomized samples of pollution effects in waterways and cannot be given solid statistical interpretations. However, the reported number of fish kills more closely approximates a random sample than the number of fish killed, and provides a more significant measure for analyzing effects of pollution.

Analyses of these and other categories of operations causing pollution are given in the following paragraphs.

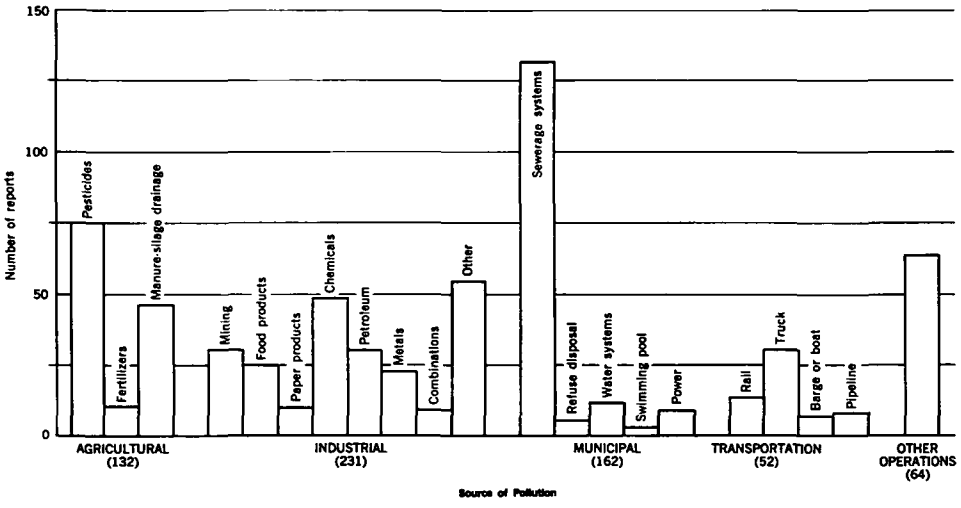
FIGURE 3—Reported Number of Fish Killed by Source of Pollution



OF THE TWENTY-ONE IDENTIFIED SOURCES OF POLLUTION . . .

. . . municipal sewerage systems was the leading killer of fish in 1971. Figure 3 shows the relationship between the reported number of fish killed and the individual sources of pollution. Note that the reported number of fish killed per individual source varies between 930 fish killed by pollution from "swimming pool" operations and 21.4 million fish killed by pollution from "sewerage systems" operations.

FIGURE 4—Number of Fish Kill Reports by Source of Pollution
(Total: 860)



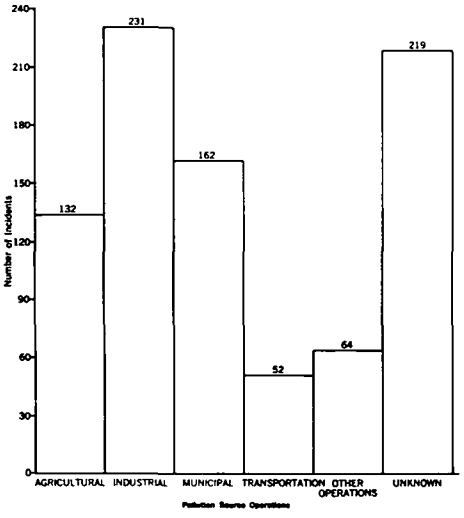
SEWERAGE SYSTEMS UNDER MUNICIPAL OPERATIONS . . .

. . . led all other individual sources of pollution in the number of reported fish kill incidents. Figure 4 shows the relationship between the number of reports and the individual sources of pollution. Note that the number of reports varies from one for "barge or boat" to 133 for "sewerage systems." Unknown operations are not included.

OF THE FIVE MAJOR SOURCES OF POLLUTION, INDUSTRIAL OPERATIONS LED IN NUMBER OF REPORTED INCIDENTS IN 1971 . . .

. . . with Municipal Operations in second place. Figure 5 shows the relationship between the reported number of fish kill incidents for the major pollutional sources. Due to the large number of fish kill incidents by unidentifiable pollution sources, the unknown category has been added to this graph. Note that the height of the bars is proportional to the reported number of fish kill incidents.

FIGURE 5—Reported Number of Incidents of Pollution-Caused Fish Kills by Major Pollution Source Operations and Unidentified Pollution Agents



Industrial Operations

In 1971, pollution from industrial operations ranked first in the number of reported incidents (231) resulting in approximately 4.9 million fish killed (Figure 5). In 1970, pollution from industrial operations also ranked first, with 213 reported incidents killing approximately 9.8 million fish. Thus, 1971 reports show an increase in reported incidents in spite of the decreased number of fish killed.

Chemical operations accounted for more than 21 percent (49 reported incidents) of the total charged to industrial pollution.

Municipal Operations

In 1971, pollution from municipal operations ranked second in the number of reported incidents (162) resulting in approximately 25.0 million fish killed (Figure 5). This major pollution source was the largest single fish killer in 1971. In 1970, pollution from municipal operations ranked third with 119 reported incidents killing approximately 6.7 million fish, indicating a significant increase in reports and number of fish killed by this pollution source in 1971.

Sewerage systems was the cause of pollution in 133 reports, accounting for 82.1 percent of the total number of incidents resulting from municipal operations. The majority of these reports indicated low dissolved oxygen as the immediate cause of death.

Agricultural Operations

In 1971, pollution from agricultural operations ranked third in the number of reported incidents (132) resulting in approximately 1.1 million fish killed (Figure 5). In 1970, pollution from agricultural operations ranked fourth, with 107 reported incidents killing approximately 1.9 million fish.

Pesticides (75 reports) was the second leading individual source of pollution. Reports of fish kills under pesticides include incidents in which spraying machinery and pesticide containers were cleaned or dumped into nearby streams, lakes, or estuaries. However, the majority of reported incidents resulted from pesticides being washed into water by rainfall after spraying for agricultural purposes.

Manure-silage drainage (46 reports) also constituted a significant cause, with animal feedlot runoff the major contributor.

Other Operations

In 1971, pollution from "other operations" ranked fourth in the number of reported incidents (64) resulting in approximately 7.3 million fish killed (Figure 5). In 1970, pollution from other operations ranked second, with 167 reported incidents killing approximately 3.9 million fish. The significant decrease in the number of reported incidents resulted from the inclusion in 1970 of "unknown operations" in "other operations."

Other operations include highway and building construction, airport and service station operations, mosquito control and others not specifically designated in this report.

Transportation Operations

In 1971, pollution from transportation operations ranked fifth (and last) in the number of reported incidents (52) resulting in approximately 0.7 million fish killed (Figure 5). In 1970, pollution from transportation operations also ranked fifth with 28 reported incidents killing approximately 0.5 million fish. Fish kills caused by transportation operations occur, for example, when a pipeline springs a leak sending oil flowing into streams, or when a truck or railroad tank car overturns, spilling a lethal cargo into a waterway.

Unknown Operations

In 1971, unknown operations, a new classification, was added as a major source of pollution. "Unknown" is used when a fish kill cannot be linked to a specific pollutant or pollution source, but an investigator is reasonably confident that the fish did not die from natural causes. In many cases an investigator is not notified that a fish kill occurred until it is too late to identify a specific pollution agent due to the deterioration of fish. In 1971, unknown operations were responsible for 219 reported incidents resulting in approximately 35.4 million fish killed (Figure 5). The source of pollution was unidentifiable for approximately 25 percent of all reported incidents in 1971.

Analyses of Pollution-Causing Operations—Environmental Protection Agency Regional Basis

A summary of the reported number of pollution-caused fish kill incidents and pollution source operations within each Environmental Protection Agency Region is given in Table 9. This table permits a comparison of the frequency of reported incidents in different sections of the U.S. due to different pollution sources. Figures 6 through 15 are bar charts for each Environmental Protection Agency Region. These charts indicate the percent of reported incidents within a given region for individual sources of pollution, and also list the states within each respective region. Figures in the charts are derived from Table 9.

Agricultural Operations

Manure-silage drainage in Region V (21 reports) was the most frequently reported individual source of pollution under agricultural operations for any of the ten regions. However, pesticides were responsible for 16 reported incidents in Region VI, and 15 reported incidents in both Regions IV and IX, making it the leading agricultural source of reported pollution-caused fish kill incidents for all regions combined. Fertilizers were reported as the pollution source in 11 fish kill incidents from Regions III, V, and VII but represent only 8.3 percent of the agricultural operations total.

Industrial Operations

Chemicals in Region III (14 reports) was the most frequently reported individual source of pollution under industrial operations for any given region, and also for all regions combined (49 reports). "Other", also under industrial operations, was not included in this analysis since it comprises several individual sources of pollution.

Municipal Operations

Sewerage systems in all regions was the most frequently reported individual source of pollution (Region X excepted) under municipal operations, totaling 133 reported fish kill incidents. Regions IV, V, and VI accounted for 92 reported incidents, or 57 percent of all pollution-caused fish kill incidents resulting from municipal operations.

Transportation Operations

Transportation operations (52 reports for all regions) had the smallest number of reported fish kill incidents of any major pollution source operation. No individual source of pollution under transportation operations exceeded 7 percent of the regional total.

Other Operations

Other operations are a general category for those identifiable sources of pollution which do not fall into the other four major sources. In 1971, Region III accounted for 25 percent of the reported incidents caused by pollution from other operations.

TABLE 9—Number of Fish Kill Reports by Source of Pollution Within EPA Regions, 1971

Source of pollution:	EPA Regions										Total
	I	II	III	IV	V	VI	VII	VIII	IX	X	
Agricultural:											
Pesticides	2	1	4	15	9	16	6	2	15	5	75
Fertilizers			1		6		4				11
Manure-silage drainage	1		7	5	21	3	5	3	1		46
Subtotal	3	1	12	20	36	19	15	5	16	5	132
Industrial:											
Mining		1	10	7	7		3	1	1		30
Food products		3	1	2	13	3	2			1	25
Paper products		1		3	4	1	1				10
Chemicals	5	3	14	6	4	11	3		2	1	49
Petroleum		3	9	3	4	4	5		1	1	30
Metals		4	6	6	3	2		2			23
Combinations			1	2	1	5					9
Other	3	2	7	5	24	6	2		1	5	55
Subtotal	8	17	48	34	60	32	16	3	5	8	231
Municipal:											
Sewerage systems	4	9	13	29	31	32	8	3	3	1	133
Refuse disposal		1			4						5
Water systems	1	1	3	4	2					1	12
Swimming pool		1	1						1		3
Power	1	1	2		3					2	9
Subtotal	6	13	19	33	40	32	8	3	4	4	162
Transportation:											
Rail			1	2	1	2	5		1	1	13
Truck		5	8	3	4	2	1	2	5		30
Barge or boat						1					1
Pipeline			2	1	3	2					8
Subtotal		5	11	6	8	7	6	2	6	1	52
Other Operations:	2	12	16	4	5	12	3		4	6	64
Unknown:	10	18	12	51	47	30	14	2	18	17	219
Total:	29	66	118	148	196	132	62	15	53	41	860

REGION I
Connecticut
Maine
Massachusetts
New Hampshire
Rhode Island
Vermont

REGION II
New Jersey
New York

REGION III
Delaware
District of Columbia
Maryland
Pennsylvania
Virginia
West Virginia

REGION IV
Alabama
Florida
Georgia
Kentucky
Mississippi
North Carolina
South Carolina
Tennessee

REGION V
Illinois
Indiana
Michigan
Minnesota
Wisconsin

REGION VI
Arkansas
Louisiana
New Mexico
Oklahoma
Texas

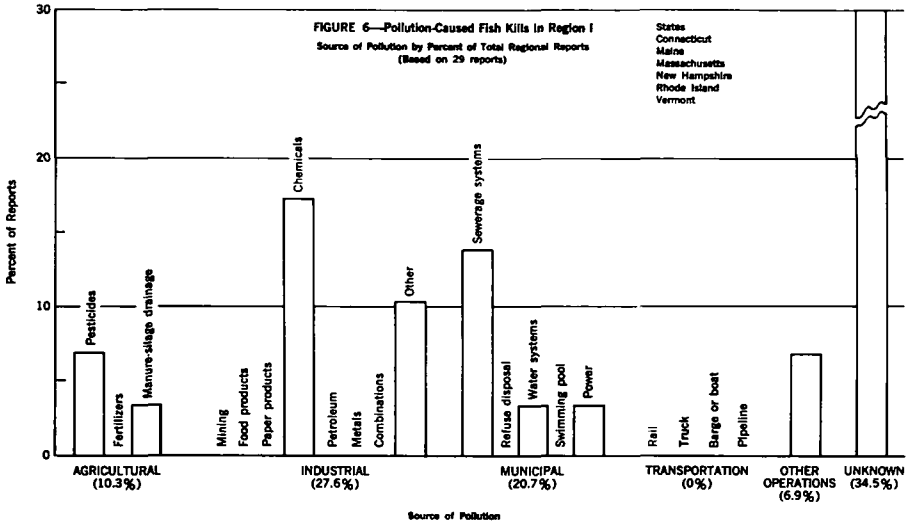
REGION VII
Iowa
Kansas
Missouri
Nebraska

REGION VIII
Colorado
Montana
North Dakota
South Dakota
Utah
Wyoming

REGION IX
Arizona
California
Hawaii
Nevada

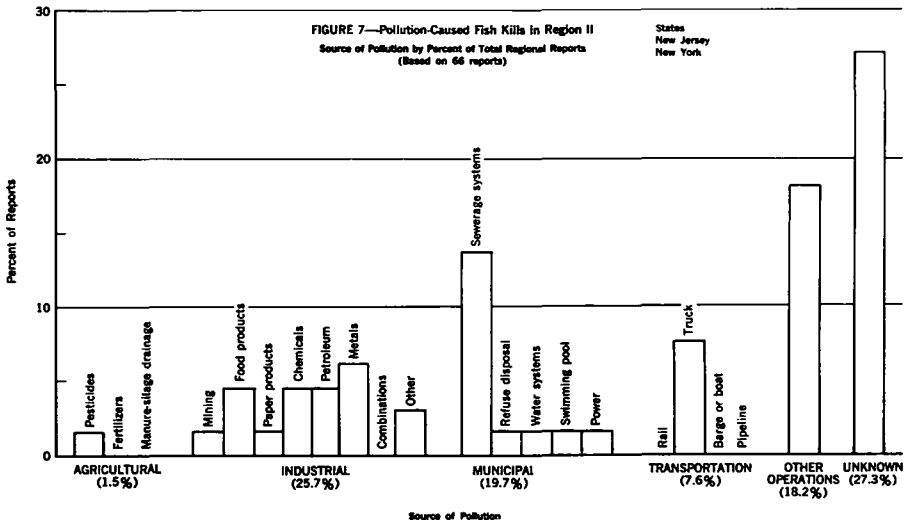
REGION X
Alaska
Idaho
Oregon
Washington

Table 9 compares the number of reported pollution-caused fish kill incidents by individual source of pollution within, and between, each EPA region. Region VIII reported the smallest number of fish kill incidents (15 reports) while Region V (196 reports) led in the number of reported incidents.



IN 1971, "CHEMICALS" LED IN REGION I . . .

. . . among individual sources of pollution (Figure 6) with 17.2 percent of the total number of reported fish kill incidents in this region, while "sewerage systems" was second with 13.8 percent of the reported total. These percentages are based on 29 fish kill reports in Region I.

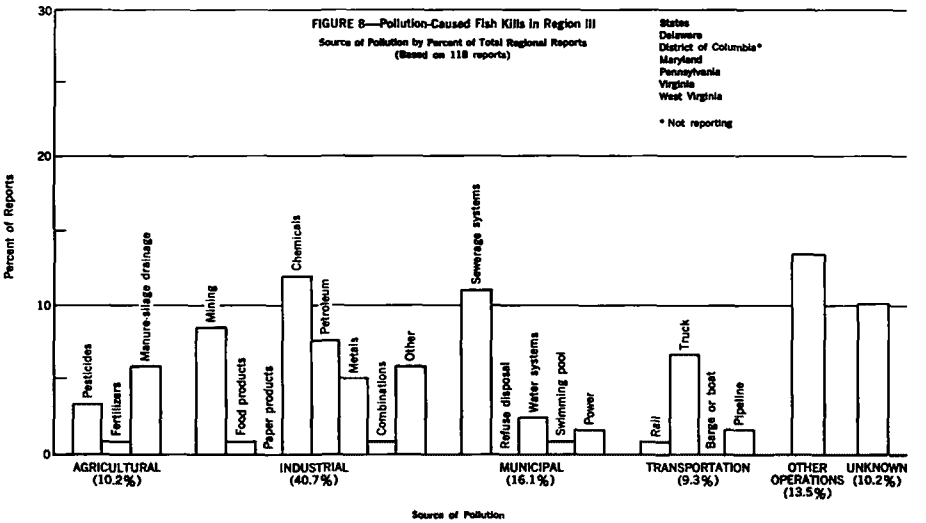


IN 1971, "SEWERAGE SYSTEMS" LED IN REGION II . . .

. . . among individual sources of pollution (Figure 7) with 13.6 percent of the total number of reported fish kill incidents in this region, while pollutants spilled due to "truck" operations were second with 7.6 percent of the reported total. These percentages are based on 66 fish kill reports in Region II.

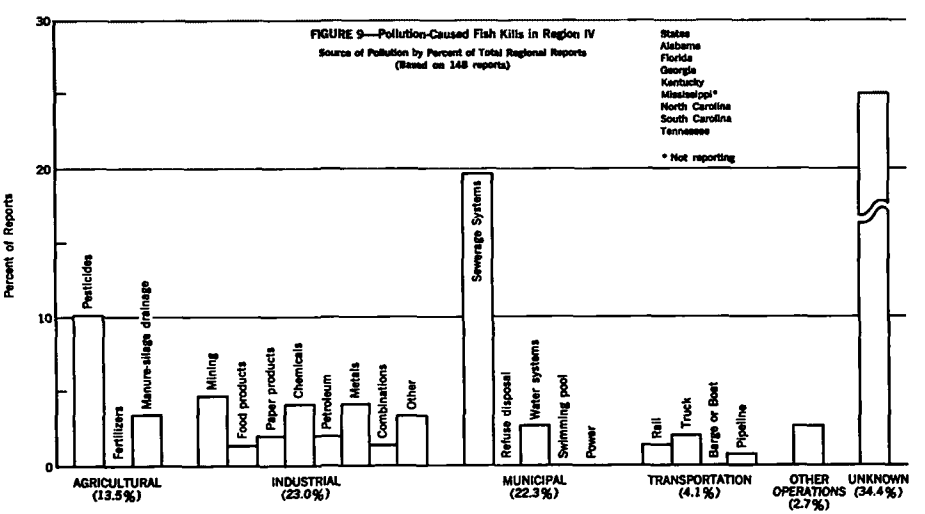
IN 1971, "CHEMICALS" LED IN REGION III . . .

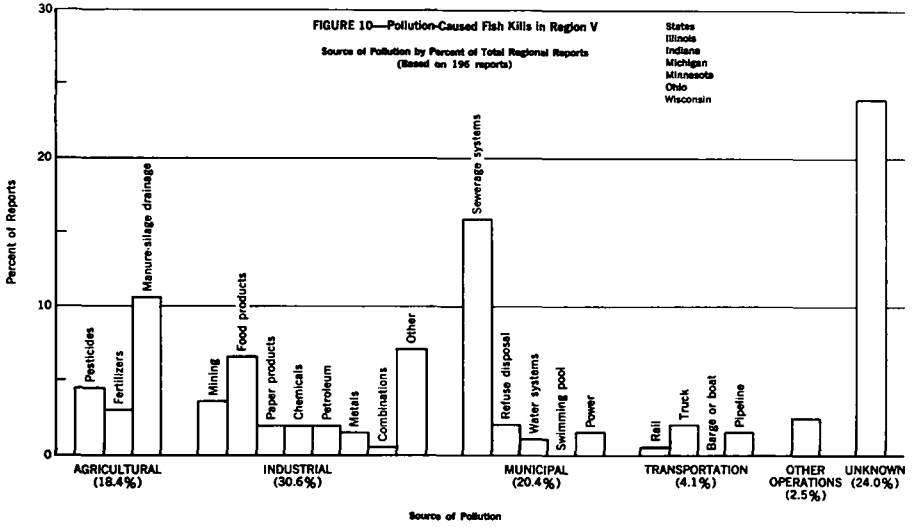
. . . among individual sources of pollution (Figure 8) with 11.9 percent of the total number of reported fish kill incidents in this region, while "sewerage systems" was second with 11.0 percent of the reported total. These percentages are based on 118 fish kill reports in Region III.



IN 1971, "SEWERAGE SYSTEMS" LED IN REGION IV . . .

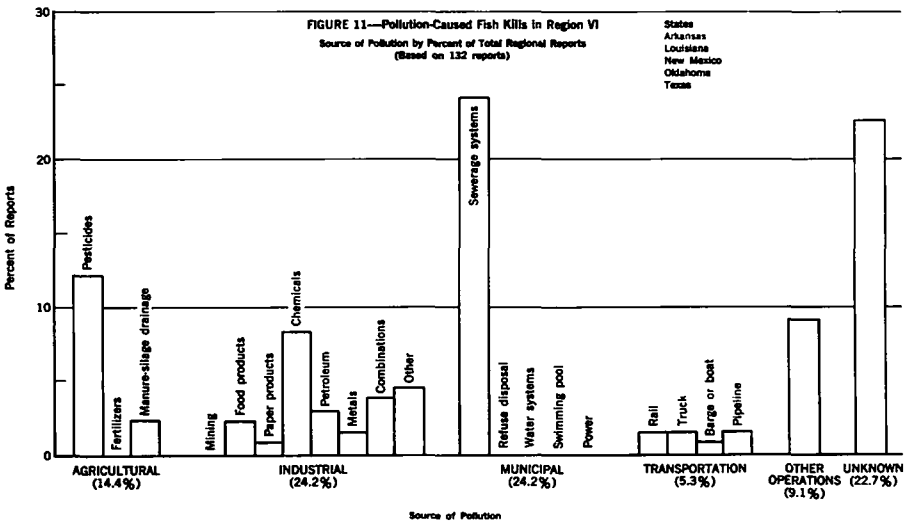
. . . among individual sources of pollution (Figure 9) with 19.6 percent of the total number of reported fish kill incidents in this region, while "pesticides" was second with 10.1 percent of the reported total. These percentages are based on 148 reports in Region IV.





IN 1971, "SEWERAGE SYSTEMS" LED IN REGION V . . .

. . . among individual sources of pollution (Figure 10) with 15.8 percent of the total number of reported fish kill incidents in this region, while "manure-silage drainage" was second with 10.7 percent of the reported total. These percentages are based on 196 reports in Region V.

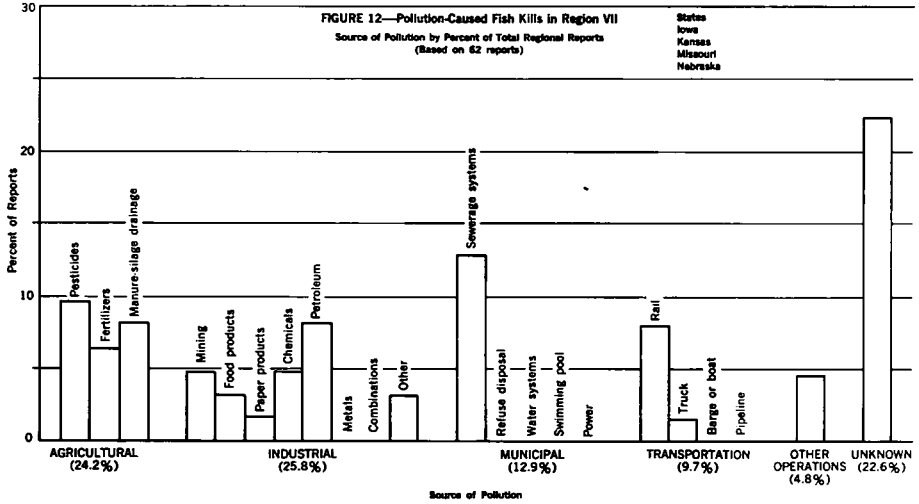


IN 1971, "SEWERAGE SYSTEMS" LED IN REGION VI . . .

. . . among individual sources of pollution (Figure 11) with 24.2 percent of the total number of reported fish kill incidents in this region, while "pesticides" was second with 12.1 percent of the reported total. These percentages are based on 132 reports in Region VI.

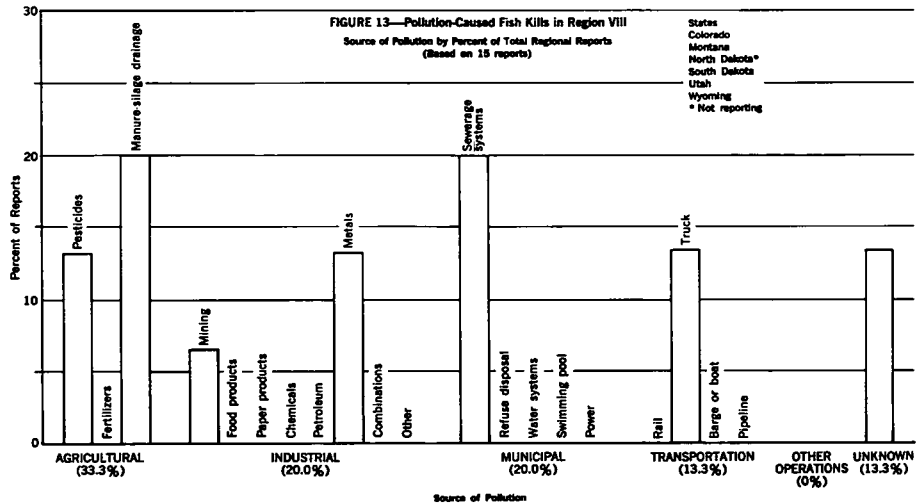
IN 1971, "SEWERAGE SYSTEMS" LED IN REGION VII . . .

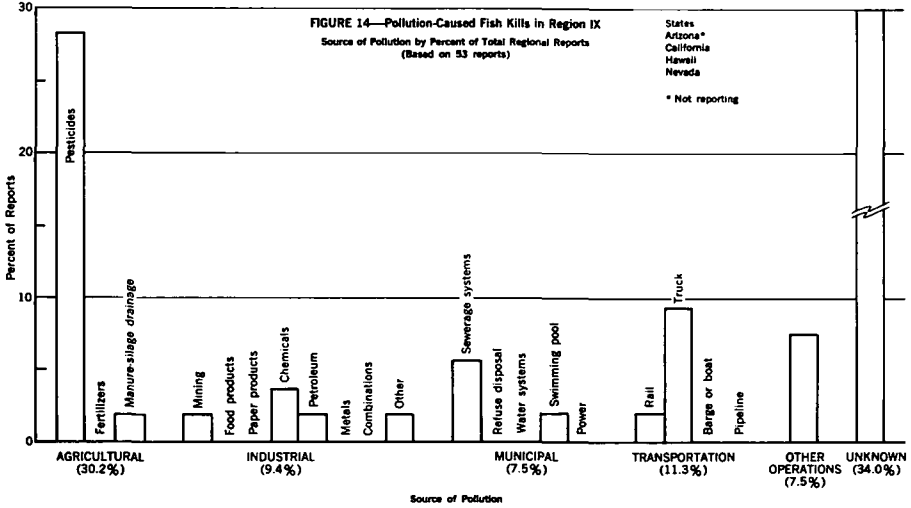
. . . among individual sources of pollution (Figure 12) with 12.9 percent of the total number of reported fish kill incidents in this region, while "pesticides" was second with 9.7 percent of the reported total. These percentages are based on 62 reports in Region VII.



IN 1971, "SEWERAGE SYSTEMS" AND "MANURE-SILAGE DRAINAGE" TIED FOR THE LEAD IN REGION VIII . . .

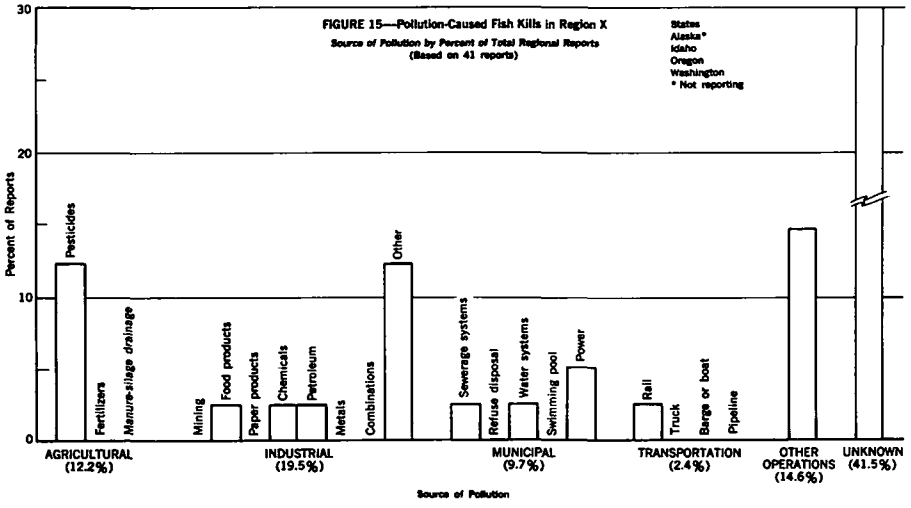
. . . among individual sources of pollution (Figure 13) with 20.0 percent each of the total number of reported fish kill incidents in this region. These percentages are based on 15 reports in Region VIII.





IN 1971, "PESTICIDES" LED IN REGION IX . . .

. . . among individual sources of pollution (Figure 14) with 28.3 percent of the total number of reported fish kill incidents in this region, while "truck" was second with 9.4 percent of the reported total. These percentages are based on 53 reports in Region IX.



IN 1971, "PESTICIDES" LED IN REGION X . . .

. . . among individual sources of pollution (Figure 15) with 12.2 percent of the total number of reported fish kill incidents in this region, while "power" was second with 4.9 percent of the reported total. These percentages are based on 41 reports in Region X.

Table 10 lists individual fish kills with identified causes by State. Tabular heading information for each fish kill includes body of water, city or town, date of kill, cause, type of fish killed (game or nongame), percent of commercial value, estimated fish killed, severity, extent of damage, and duration.

TABLE 10—Report of Fish Kills, 1971—Cause Identified

Body of water	City or town	Date	Cause [1] see code page 32	Type of fish killed: Percent game	Type of fish killed: Percent nongame	Percent kill with commercial value	Estimated fish killed	Severity [2] see code page 32	Estimated miles or acres affected [3]	Duration: Days	Duration: Hrs.
ALABAMA											
Locust Fork	Birmingport	7 17 71	27	10	90	10	1,000,000	2	32M	2	..
Waxahatchee Cr	Columbiana	5 10 71	26	10	90	.	2,571	1	14M	..	..
Clark Spring Br	Decatur	10 18 71	31	52	48	9	920	2	2M	2	..
Wheeler Reservoir	Decatur	12 02 71	24	42	58	..	179	4	..	..	..
Wheeler Reservoir	Decatur	12 11 71	24	1	99	..	11,550	3	..	..	..
Wheeler Reservoir	Decatur	12 28 71	24	60	40	..	4,990	3	..	..	..
Locust Fork	Flat Top	6 16 71	27	32	68	64	196	4	2M	..	..
Valley Creek	Gilmore	9 24 71	31	1	99	1	2,500,000	2	1M	1	..
Eslava Cr-Dog R	Mobile	7 15 71	31	..	100	100	2,030,035	2	1M	..	18
Garrows Bend Bay	Mobile	6 29 71	23	.	100	100	1,500	3	..	..	..
Garrows Bend Ch	Mobile	8 25 71	23	1	99	99	30,498	2	..	..	..
Industrial Canal	Mobile	5 11 71	31	1	99	62	2,920	3	2M	2	..
Industrial Canal	Mobile	8 01 71	31	..	100	100	403,780	2	2M	1	..
Polecat Bay	Mobile	1 07 71	21	..	100	1	5,006	2	5A	..	..
Polecat Bay-Ca	Mobile	1 07 71	26	..	100	..	200	4	5M	..	..
Beaverdam Creek	Mooresville	8 24 71	11	84	16	..	778	3	2M	2	..
Beech Creek	Selma	9 22 71	26	.	100	..	350	4	1M	2	..
Beech Creek	Selma	8 30 71	26	30	70	12	1,418	..	1M	3	..
Six-Mile Creek	Somerville	6 18 71	13	15	85	..	9,123	2	5M	2	..
Lake Tuscaloosa	Tuscaloosa	8 22 71	11	70	30	25	6,373	..	20A	2	12
ARKANSAS											
Big Creek	Bloomer	7 01 71	28	50	50	..	12,000	1	2M	4	..
Spadra Creek	Clarksville	5 05 71	13	30	70	15	3,500	1	4M	2	..
Salado Creek	Floral	6 09 71	44	60	40	20	2,864	2	5M	4	..
Lake Hamilton	Hot Springs	2 22 71	26	20	80	..	14,940	1	3A	3	..
Little Buffalo R	Jasper	6 16 71	31	15	85	..	250	3	1M	1	..
Johnson Trout Fm	Johnson	11 06 71	42	100	..	100	75,000	1	..	..	1
Mud Creek	Johnson	5 18 71	11	20	80	..	2,000	1	2M	1	..
Bayu Two Prairie	Lonoke	8 03 71	11	3	97	..	..	3	12M	..	..
Lee Brnch-Spadra	Washington Co	8 06 71	13	10	90	..	950	1	1M	1	..
CALIFORNIA											
Pine & Mill Cr	Bishop	8 24 71	21	100	..	..	1,000	1	1M	..	..
Palo Verde Irrig	Blythe	2 16 71	11	2	98	..	..	3	..	..	..
Churn Cr	Central Valley	7 02 71	24	50	50	..	500	2	1M	..	..
Churn Creek	Central Valley	7 02 71	24	50	50	..	500	2	1M	..	..
Little Chico Cr	Chico	5 12 71	34	10	90	..	800	3	1M	..	24
Dist 999 Canal	Clarksburg	5 13 71	11	1	99	..	2,035	2	3M	..	24
Icaria Creek	Cloverdale	5 03 71	42	100	..	..	300	2	1M	1	..
Sacramento R	Dunsmuir	7 22 71	41	100	.	..	500	3	6M	..	..
Sacramento River	Dunsmuir	7 22 71	25	100	..	..	500	3	6M	..	..
Rattlesnake Cr	Forest Glen	9 24 71	42	50	50	..	2,000	2	1M	1	..
Canal-Sheldon Av	Gridley	6 29 71	11	25	75	..	575	2	3M	..	24
Farm Pond	Hamilton City	3 13 71	11	100	..	..	5,100	1	2A	1	..
San Mateo Creek	Hillsborough	8 12 71	31	100	..	..	300	3	1M	1	..
Pear Canal	Holtville	4 01 71	11	2	98	..	..	3	1M	..	..
Moss Landing Lag	Moss Landing	8 12 71	50	..	100	..	300	3	5A	1	..
Bel Marin Keyes	Novato	5 20 71	50	100	..	..	500	2	25A	1	..
Redwood Shores	Redwood City	9 20 71	28	1	99	5	11,000	3	5A	1	..
Butte Creek	Richvale	9 07 71	11	25	75	..	1,325	2	12M	..	24
S F Bay	San Francisco	4 08 71	31	20	80	..	600	3	25A	1	..
Guadalupe River	San Jose	3 22 71	42	10	90	..	300	4	1M	..	..
Tidewater Creek	San Rafael	10 15 71	31	10	90	..	50	4	1M	..	3
Unnamed Creek	Santa Rosa	4 14 71	13	..	100	..	50	4	1M	..	..
Martis Cr	Truckee	11 06 71	50	33	67	..	1,015	1	3M	4	..
Horse Creek	Vacaville	8 12 71	11	10	90	..	275	3	..	..	..
Corralitos Cr	Watsonville	5 11 71	11	94	6	..	800	..	3M	..	..
Boles Creek	Weed	11 03 71	42	100	..	..	30	4	1M	..	1
Boles Creek	Weed	8 15 71	42	95	5	..	525	3	2M	..	2
Ca S Mallard R	West Sacramento	7 20 71	11	1	99	..	275	2	3M	..	24
Adams Ditch	Winters	8 24 71	11	66	34	..	3,000	2	5M	..	24
Knight Cut	Woodland	5 31 71	11	25	75	..	575	4	..	..	..
COLORADO											
Rio Grade River	Creede	9 01 71	31	100	..	..	1,000	4	15M	4	..
Rio Grade River	Creede	8 31 71	26	100	..	..	600	..	..	2	..
CONNECTICUT											
Broad Brook Strm	Ellington	9 05 71	13	20	80	..	10,000	1	4M	..	..
East Aspetuck R	New Milford	8 09 71	50	34	66	..	300	..	2M	..	..
Thames River	Norwich	9 06 71	31	..	100	100	1,000,000	2	1M	3	..
Trout Brook	Plainville	8 19 71	28	10	90	..	200	1	1M	.	.
Middle River	Stafford Sprngs	9 11 71	28	.	100	..	..	..	1M	..	..
Millstone Point	Waterford	8 — 71	35	..	100	100	2,000,000	..	..	99	..
DELAWARE											
St Jones River	Dover	7 02 71	31	90	10	..	1,250	2	1M	2	..
FLORIDA											
Lake Glenada	Avon Park	3 11 71	31	1	99	..	4,010	4	..	..	..
Lake Glenada	Avon Park	2 17 71	31	1	99	..	2,078	4	..	1	..
Rim Ca-Okeechobee	Bell Glade	9 03 71	13	20	80	30	2,000	2	320A	3	..
Lake Menzie	Dundee	7 23 71	28	99	1	..	7,380	2	15A	1	..
Peace River	Fort Meade	12 03 71	21	..	..	..	..	2	50M	3	..
Williamson Creek	Jacksonville	9 11 71	31	12	88	87	1,167	3	15A	2	..
Williamson Creek	Jacksonville	9 — 71	31	1	99	99	11,738	3	15A	2	..
Banana Lake	Lakeland	3 29 71	31	4	96	..	273,100	2	342A	3	..
Canal	Margate	7 07 71	33	90	10	..	100	3	1A	..	..

TABLE 10—Report of Fish Kills, 1971—Cause Identified—Continued

Body of water	City or town	Date	Cause [1] see code page 32	Type of fish killed: Percent game	Type of fish killed: Percent non-game	Percent kill with commercial value	Estimated fish killed	Severity [2] see code page 32	Estimated miles or acres affected [3]	Duration: Days	Duration: Hrs.
Pemberton Creek	Plant City	2 — 71	31			15	4,700	3	9M	28	..
Arbuckle Creek	Sebring	10 29 71	41	95	5			2	6M	1	..
Dinner Lake	Sebring	4 05 71	28	91	9		118	4		60	..
La Thonotosassa	Thonotosassa	4 16 71	31	74	26	6	3,700	3	819A	1	..
La Thonotosassa	Thonotosassa	2 24 71	31	28	72		50	4	8A	28	..
Lake Conine	Winter Haven	9 18 71	22	50	50	50	720	1	1M		3
GEORGIA											
N Ashburn Pond	Ashburn	8 13 71	11	50	50		5,000	4	2A	2	..
Spirit Creek	Augusta	10 01 71	50	30	70				4M		..
Little Tired Cr	Cairo	6 06 71	22	98	2		4,400	2	2M	4	..
Etowah River	Cartersville	7 03 71	31	50	50		2,000		3M	1	..
Noonday Creek	Cartersville	8 04 71	11		100	90	350	3	3M	1	..
Pettit Creek	Cartersville	8 10 71	11	15	85		750	1	14M	1	..
Priv Rd-Fordham	Cochran	8 02 71	11	15	85		200	3	2A	3	..
Cordele Hatchery	Cordele	8 17 71	11	100			550	4	2A	7	..
Williamson Cr	Davisboro	6 27 71	11	60	40		300	1	5M		..
Piedmont Expermt	Eatonton	7 09 71	11	100			200	4	7A	1	..
Coosawattie Riv	Ellijay	8 14 71	24	10	90	15	38,000	2	8M	1	..
Balus Creek	Gainesville	6 25 71	50	70	30		1,000	4	1M	2	..
Alton Dykes Pond	Hawkinsville	6 20 71	11	50	50		600	2	6A		..
Priv Rd W Hanson	Rentz	11 03 71	50		100	100	300	4	3A	21	..
Private Pond	Swainsboro	6 19 71	11	100			1,850	3	12A	1	..
Ocmulgee River	Warner Robins	8 27 71	31	60	40		500	3	8M	3	..
HAWAII											
Kapakahi Canal	Honolulu	3 09 71	11	13	87	79	1,210	2	1M	1	..
Moanalua Stream	Honolulu	3 05 71	11	6	94	94	6,000	2	1M	2	..
Waimalu Stream	Waimalu	6 25 71	50		100	2	225	4	1M	2	..
IDAHO											
American Falls R	Aberdeen	2 — 71	22	2	98		612	2	10A		..
Boise River	Boise	11 19 71	31	100			400	3	1M	2	..
Logger Creek	Boise	7 28 71	11	20	80		5,000	1	2M	2	..
Snake-Salmon Riv	Butte County	7 — 71	35	100			11,000	2		25	..
Portneuf River	Lava Hot Spring	7 27 71	11	60	40		1,000	3	7M	2	..
Lamberts Pond	McCall	6 20 71	28	100				1	1A		..
ILLINOIS											
Gar Creek	Kankakee	6 15 71	24	1	99	12	10,793	2	2M		18
Soldiers Creek	Kankakee	9 16 71	24	11	89	12	17,020	1	1M		..
W Br Salt Fork	Leverett	5 03 71	12	1	99	1	4,842	2	8M	2	..
2 & Vermillion Cr	Mendota	9 09 71	22	1	99	6	26,060	2	4M	3	..
Casey Fork Creek	Mt Vernon	7 08 71	28	62	38	37	5,913	1	6M	2	..
Brs Vermilion R	Paxton	4 16 71	12	3	97	1		2	4M		..
Rock River	Rock Falls	7 31 71	27	42	58	21	98,945	2	10M		10
INDIANA											
W Fk-White River	Anderson	9 03 71	31		100		470	3			..
Moots Creek	Brookston	8 24 71	13	20	80		1,200	2	2M		..
Spring Creek	Brookston	8 03 71	12								..
White Creek	Brownstown	10 12 71	13		100		150	4	6M		..
Symonds Creek	Cambridge City	7 15 71	42	35	65		214	3			..
Doe Creek	Cloverdale	9 06 71	13	40	60		380	2	1M		..
Campbell Ditch	Elizaville	6 29 71	11								..
Jacks Defeat Cr	Elletts ville	8 21 71	31	40	60		150	3	2M		..
Duck Creek	Elwood	9 02 71	31	15	85		1,460	2	12M		..
Deer Creek	Fillmore	6 18 71	13	20	80		558	3	2M		..
Harber Ditch	Fort Wayne	11 26 71	50	2	98		159	1	1M		..
Mud Pine Creek	Fowler	10 18 71	31				500	2	2M		..
Mill Creek	Headlee	9 06 71	11	10	90		100	4	1M		..
Perry Creek	Kingman	5 06 71	11								..
Kokomo Creek	Kokomo	7 13 71	28	90	10		397	2			..
Grassy Br-Eel R	New Brunswick	6 28 71	11	25	75		1,038	3			..
Lilly & Pipe Crs	Orestes	10 02 71	22	10	90			2	15M		..
Storm Creek	Seymour	12 17 71	44				100	2			..
Bell Creek	Sulphur Springs	6 24 71	12				4,245	2			..
Tippecanoe River	Warsaw	9 30 71	13	50	50		20,000	2	47M	4	12
Richland Creek	Whitehall	6 24 71	13	5	95		350	3			..
IOWA											
Big Sioux River	Beloit	9 17 71	28	5	95		15,000	2	15M		..
Stewart Creek	Charles City	4 22 71	42	5	95		50,000	1	4M	1	..
Deep Creek	Clare	7 23 71	13		100		10,000	1	1M		..
Maus Park Pond	Dubuque	5 21 71	23	30	70		5,000	1	5A	7	..
E Nishnabotna R	Exira	7 02 71	41	15	85		35,000	1	3M	1	..
Spring Creek	La Porte City	8 18 71	22	2	98		10,000	1	5M		..
KANSAS											
W Br Walnut Riv	El Dorado	6 15 71	41	25	75	50	2,500	1	2M	1	..
Cow Creek	Hutchinson	1 25 71	50	40	60	60	1,000	1	1M		2
Rock Creek	Independence	5 30 71	41	60	40	20	2,000	2	3M	5	..
Trib-Arkansas R	Maize	4 10 71	31	5	95	10	175	3	1M		..
Elm Creek	Miller-Lyon Co	7 06 71	13	35	65	45	2,500	2	2M	1	..
Gillion Creek	Potwin	4 30 71	13	35	65	60	4,300	1	7A	5	..
Trib-Arkansas R	Wichita	8 30 71	50	100		10	300	3			..
KENTUCKY											
Gunpowder Creek	Florence	4 16 71	25	60	40	70	1,953	2	6M	12	8
S Fk Salt River	Harrodsburg	8 17 71	31				3,479	2	2M		20

TABLE 10—Report of Fish Kills, 1971—Cause Identified—Continued

Body of water	City or town	Date	Cause [1] see code page 32	Type of fish killed: Percent game	Type of fish killed: Percent non-game	Percent kill with commercial value	Estimated fish killed	Severity [2] see code page 32	Estimated miles or acres affected [3]	Duration: Days	Duration: Hrs.
So Fork Little R	Hopkinsville	5 27 71	26	20	80			1	4M	4	
Beargrass Creek	Jefferson Co	9 29 71	25		100		1,000		1M		4
Jessamine Cr	Jessamine Co	8 24 71	26					4	1M	1	
Silver Creek	Madison Co	11 17 71	31				30,598	1	2M	2	7
Triplett Creek	Morehead	8 30 71	31				100		3M	3	6
Hinkston Creek	*Mt Sterling*	*8 08 71*	*25*					4	11M	1	
Tradewater River	Providence	8 06 71	21					4			
Sexton Creek	Sexton	7 02 71	21	20	80		10,000	1	10M	2	
Sexton Creek	Sexton	6 09 71	21	5	95			4	1M	1	
Long Lick	Shepherdsville	10 12 71	50				1,468	3	1M	3	10
St Asaph Creek	Stanford	4 22 71	11				6,506	2	1M	1	5
Beech Creek	Waddy	9 11 71	13				21	4	2M		17
Tules Creek	Westview	7 28 71	13				6,465	1	3M	7	11
LOUISIANA											
Bayou Roberts	Alexandria	9 02 71	11	30	70	40		4	1M	1	
Irish Canal	Alexandria	4 23 71	41	25	75	5	500	2	1M		
Red River	Alexandria	7 29 71	31	1	99	1		4	5M	1	
Rynella Canal	Avery Island	8 01 71	11					1	3M	2	
Teche Lake Canal	Baldwin	8 11 71	11		100		1,030		6M	2	
Btn Rge Barge Ca	Baton Rouge	8 27 71	31	10	90	20	1,000	3	1M	1	
Btn Rge Barge Ca	Baton Rouge	7 16 71	24	20	80	10	4,000	2	2M	2	
Btn Rge Barge Ca	Baton Rouge	1 29 71	24	5	95	90	6,000	3	2M	2	
Btn Rge Barge Ca	Baton Rouge	1 08 71	28	10	90	90	5,000	3	2M	3	
Monte Sano Bayou	Baton Rouge	3 05 71	27	50	50		200	4	1M	1	
Sik Wtr Barge Ca	Baton Rouge	1 09 71	24	10	90	30	20,000	2	3M	3	
Bayou Dulac	Bunkie	3 25 71	22	5	95	90		4	2M	1	
Charenton Nav Ca	Charenton	8 13 71	11	10	90		20,000	2	8M	2	
Fausse Pointe La	Charenton	8 04 71	11	10	90		5,000	3	40A	2	
Bayou De Glaises	Cottonport	8 01 71	11	5	95	90		4	2M	1	
Houma Nav Canal	Dulac	7 19 71	22	10	90	90	5,000	3	5M	3	
Empire Canal	Empire	8 26 71	31	10	90	80	3,000	3	3M		12
Blind River	Gramercy	9 01 71	31	40	60	30		2			12
ICWW & 16 St Ca	Harvey	8 05 71	27		100		2,000	3	4M	1	
Calcasieu River	Lake Charles	12 10 71	24		100			2	1M		12
Calcasieu River	Lake Charles	3 01 71	28		100		200	4	2A		
Sabine River	Logansport	8 06 71	22	25	75		500	3	6M		24
Toledo Bend Resr	Logansport	9 20 71	31	30	70	10	50,000	2	10M	3	
Ouachita River	*Monroe*	*7 03 71*	*27*	*1*	*99*		*2,500*	3	*2M*	*1*	
Bayou Teche	New Iberia	11 12 71	28	5	95	80	400	2	6M	3	
Bayou Teche	New Iberia	12 23 71	28			100	100	4	3M		
Bayou Bienvenue	New Orleans	8 31 71	31	10	90	50	3,000	2	3M		12
Bayou Michaud	New Orleans	9 02 71	11	60	40		500	3		3	
Calcasieu River	Oberlin	7 04 71	23	75	25	10		4	1M	1	
Bayou Bulltail	Plaquemine	5 21 71	43	50	50	25	7,500	1	3M		8
Bayou La Butte	Plaquemine	4 21 71	24	10	90	5	3,500	1	1M	1	
40 & 28 Arpent C	Raceland	7 27 71	11	80	20	80	5,500	2	20M	5	
Cross Bayou	Shreveport	10 21 71	31	5	95	40	2,000	2	2M	1	
Cross Lake	Shreveport	12 16 71	41	100			1,000	2		3	
Cross-12-Mi Bayu	Shreveport	11 29 71	31		100	90	1,000	3	4M	1	
Twelve-Mi Bayou	Shreveport	10 26 71	31	5	95	40	3,000	2	6M	1	
Salt Bayou	Slidell	9 12 71	31	20	80	70	1,000,000	2	6M	2	
Red Chute Canal	Sligo	5 16 71	11	100			400	3	1M		12
Bayou Braud	St Gabriel	8 23 71	24	50	50	50	7,500	2	9M	3	
Bayou Lafourche	Thibodaux	7 27 71	11				1,000	3	10M	5	
Little River	*Tullos*	*9 03 71*	*24*	*50*	*50*	*50*	15,000	2	20M	2	
Lake Natchez	White Castle	8 02 71	11	50	50	25	2,000	1	5M		
Bay Ronfleur	Wisner	9 02 71	50	50	50		1,000	2	160A		12
MAINE											
Youngs Brook	Westfield	7 11 71	33	70	30		400	1	1M		
MARYLAND											
Baltimore Harbor	*Baltimore*	*2 18 71*	*25*	*75*	*25*		*2,000*			14	
Bear Creek	Baltimore	9 16 71	26	1	99	100	177,550				
Lt Blackwater R	Cambridge	5 04 71	13		100		30			1	
Basin Run	Colora	8 24 71	13								
Basin Run	Colora	8 14 71	13								
Susquehanna Riv	Conowingo	5 09 71	35		100	100	1,253,516				
Riviera Beach Pd	Riviera Beach	5 — 71	50	14	86		3,000		10A	10	
Pawn Run	Sand Flat	8 20 71	11	34	66		100		1M		
Ross Cove	Severna Park	7 12 71	50	1	99		800		1A		
Piney Run	Taneytown	6 19 71	31	99	1		113,000		2M		
Little Pipe Cr	Westminster	6 21 71	31		100		3,000		5M		
MASSACHUSETTS											
Great Pond	Falmouth	8 07 71	11		100		15,000	3	1M		12
Green Pond	Falmouth	8 05 71	11		100		18,000	3	1M	1	
Lee River	Somerset	8 05 71	24	11	89	88	1,222,800	2	1M	1	
MICHIGAN											
5 Br Riv Raisin	Adrian	8 02 71	24					1			
Red Cedar-Grand	East Lansing	8 10 71	31				3,300	2	5M	1	
Weadock Channel	Essexville	10 21 71	28	1	99		4,000	2	1M		1
Frank & Poet Drn	Gibraltar	1 25 71	26		100		50,000	1	1M	2	
Tittabawassee R	Midland	7 27 71	24	50	50		2,000	1	2M		1
MINNESOTA											
Red Cedar River	*Austin*	*7 02 71*	*11*	*25*	*75*		*3,000*	2	5M		
Red Cedar River	Austin	7 22 71	31	10	90		3,000	2	2M		

TABLE 10—Report of Fish Kills, 1971—Cause Identified—Continued

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St Louis River	Cloquet	9 29 71	31		100		200	4	1M		
Cannon River	Faribault	3 05 71	22	50	50		150	4	1M		
Sunrise River	North Branch	6 20 71	11	20	80		10,000	2	6M		
MISSOURI											
Drainage Ditches	Advance	3 24 71	11	60	40		25,000	2	10M		
Blackberry Creek	Asbury	9 02 71	21	80	20		12,000	2	8M		
N Fk Salt River	Brashear	9 26 71	31		100		152,752	2	14M		
Charlton River	Callao	1 08 71	41						15M		
Spring River	Carthage	9 01 71	31	43	57		71,000	2	5M		
Tebo Creek	Clinton	7 29 71	21		100		6,000	2	3M		
Gans Creek	Columbia	11 11 71	50					2	2M		
Hinkson Creek	Columbia	7 31 71	21	5	95		12,600	1	2M		
N Fk S Fabius R	Edina	5 21 71	12	20	80		32,181	1	3M		
Hess Pond	Faucett	6 30 71	11					4	1A		
Cedar Fork Creek	Gerald	6 11 71	25	25	75		19,000	2	10M		
Rock Creek	Independence	7 27 71	25		100		200	4	1M		
Opossum Creek	Jasper	10 30 71	13	100			1,000	4	2M		
Center Creek	Joplin	10 17 71	24		100		20,300	4	4M		
Fox River	Kahoka	8 20 71	22		100		150	4	1M		
Middle Fk Salt R	Macon	4 16 71	24	59	41		2,300	1	3M		
Plunkett Park La	Mexico	2 25 71	41	1	99		1,000	3	6A		
Davis Creek	Mound City	6 13 71	12	1	99		12,356	1	7M		
Davis Creek	Mound City	9 01 71	25		100		2,750	3	1M		
Shoal Creek	Neosho	10 17 71	31					2	2M		
Birch Branch	Nevada	8 02 71	31					4	1M		
James River	Nixa	7 11 71	31	46	54		70,000	2	6M		
South River	Palmyra	12 21 71	24	30	70		2,500	3	1M		
Drainage Ditches	Parma	3 27 71	11	50	50		40,000	2	5M		
Rock Creek	Rock Port	4 12 71	12		100		2,500	1	3M		
Flat Creek	Sedalia	7 02 71	25	9	91		36,000	1			
Watkins Creek	St Louis	8 23 71	25		100		200	4	4M		
Cambell Pond	Success	8 02 71	11	100			100	1	1A		
Meister Branch	Troy	7 07 71	13		100		150	1	2M		
Grand Glaze Cr	Valley Park	2 11 71	31		100			2	1M		
Post Oak Creek	Warrensburg	6 15 71	28	5	95		10,000	1	3M		
MONTANA											
Prickly Pear Cr	East Helena	8 27 71	26	5	95		3,000	2	2M		
W Gallatin River	Gallatin Gatewy	9 02 71	42					4	4M		
Highwood Creek	Highwood	9 03 71	13	10	90		1,000	2	1M		
Clark Fork River	Missoula	3 22 71	21	100				4		14	
Sixteen mile Cr	Ringling	6 18 71	11	100					2M		
S Fk Crow Creek	Ronan	2 04 71	31	26	74		5,280	1	4M	1	
Denny Creek	W Yellowstone	9 29 71	42	100				4	2M		
NEBRASKA											
Pibel Lake	Bartlett	6 05 71	11	100			1,000	4	2A		
Moffett Drain	Minatare	3 24 71	11	25	75		135	2	1M		
Elm Creek	Ord	7 30 71	12	1	99		9,000	1	5M		
Weeping Water Cr	Weeping Water	10 19 71	31	6	94		235	2	1M		24
NEVADA											
S Fk Humboldt R	Elko	3 15 71	11	69	31		15,000	2	10M	5	
Salmon Falls Cr	Wells	3 26 71	11					3		4	
NEW HAMPSHIRE											
Souhegan River	Merrimack	3 16 71	31	5	95			2	1M		6
Nashua River	Nashua	9 18 71	50	5	95		5,000	2	3M		
Kezar Lake	North Sutton	6 21 71	31	1	99		100,000	2	182A	15	
NEW JERSEY											
Sunset Lake	Chatham	6 29 71	50	1	99		10,000	1	2A	3	
Trib-Drakes Brk	Flanders	9 15 71	50		100		10	4	1A		
Trib-Drakes Brk	Flanders	4 08 71	50	20	80		25	4	1M		4
Co Farm Ponds	Gloucester Twp	4 12 71	50	50	50		1,000	2	3A	5	
Bidwells Ditch	Goshen	7 07 71	50	10	90	80	2,000,000	2	4M	3	
Rocky Brook	Hightstown	5 07 71	33					1	2M	1	
Lake Hopatcong	Hopatcong	6 11 71	50	25	75		2,000	3	20A	10	
Dry Run Creek	Mays Landing	9 03 71	50		100		1,000	3	1M	3	
Taylor Lake	Millburn	10 01 71	50				400	2			
Trib-Lamington R	Oldwick	12 08 71	42	5	95		200	1	1A	2	
Mobil Lab Pond	Pennington	3 03 71	25								
Lake Carnegie	Princeton	8 14 71	50				50	4	1A		
Mohawk Pond	Red Bank	2 20 71	42		100		200	3	2A	3	
Heritage Lake	Saddle River	7 04 71	50	75	25		25	4			
Lions Head Lake	Wayne	6 07 71	50	25	75		300	4	5A	2	
NEW MEXICO											
Gila River	Cliff	7 10 71	50	100			250	2	35A	5	
NEW YORK											
Nineteen Gully	Angelica	7 26 71	22	1	99		500	4	3M	2	
Number Nine Brk	Athol	7 07 71	50	40	60		300	2	1M		4
Crane Brook	Auburn	11 11 71	28				2,500	2	4M	2	
Buffalo Creek	Buffalo	3 26 71	26		100		100	4	1M		2
Cayuga Creek	Buffalo	8 20 71	31		100		50	4	1M		4
Scajaquada Creek	Buffalo	6 02 71	24		100		10,000	2	1M	1	
Gedney Brook	Chappaqua	5 19 71	34	2	98		50	4	1M		2
Saquoit Creek	Clayville	11 05 71	23	5	95		3,000	1	4M	1	
Canadaway Creek	Fredonia	9 02 71	31		100		150	4	2M	1	

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Chattaraugus Cr	Gowanda	8 25 71	31	17	83		600	2	5M	10	
Salmon Creek	Hilton	10 13 71	31	30	70		7,500	2	3M	1	
Plum Point Creek	Himrod	12 10 71	21		100		100	1	1M	1	
Fish Creek	Holcomb	12 13 71	31		100		3,000	1	6M	1	
Allegheny River	Irvine Mills	8 06 71	25	9	91		62,000	2	1M	1	
Sixmile Creek	Ithaca	9 18 71	26		100		1,000	2	1M		2
Chadakoin R	Jamestown	5 13 71	26		100		300	2	2M	1	
English Brook	Lake George	7 22 71	42	75	25		200	1	1M	1	
Tunungwant Creek	Limestone	8 06 71	25	20	80		45,000	1	6M	2	
Little Inlet	Mayville	5 14 71	22	1	99		1,500	2	1M	7	
Cayuga Creek	Niagara Falls	4 05 71	42		100		10,000	2	1M	2	
Chenango River	Norwich	6 29 71	24	1	99		5,000	3	1M	3	
2 Mi Cr-Allghy R	Olean	2 08 71	24		100		200	4	1M	1	
Oriskany Creek	Oriskany Falls	10 14 71	28	1	99		5,000	2	2M	1	
Barge Canal	Pittsford	4 28 71	31	1	99		5,000	2	3M	14	
Barge Canal	Pittsford	12 07 71	31	1	99		2,000	2	1M	3	
Red Creek	Red Creek	7 22 71	22		100		75	4	1M	1	
Canandaigua Otlt	Shortsville	10 10 71	31	1	99		100	3	7M	1	
Fivemile Creek	Ticonderoga	6 09 71	11	30	70		10,000	1	3M	3	
Hudson River	Tomkins Cove	6 07 71	35	100		100	1,000	1	1M		1
Third Brook	Walton	5 05 71	32	1	99		7,000	1	3M	1	
Oatka Creek	Warsaw	8 10 71	26		100		7,500	3	1M		3
Trib 5 of Big Cr	Waterville	7 23 71	42		100		10	3	1M	1	
Ellicott Creek	Williamsville	9 14 71	31		100		20,000	2	6M	3	
NORTH CAROLINA											
Middle Fk-New R	Blowing Rock	5 10 71	33	5	95		1,359	3	5M		6
Bear Swamp	Bowdens	7 07 71	11	25	75		572	2	1M		
Cold Water Creek	Concord	7 16 71	44		100		600	2			
Indian Swamp	Fairmont	6 14 71	11	50	50		400	1	1M	3	
Little River	Goldsboro	6 17 71	31	74	26		500	3	1M	1	
Green Mill Run	Greenville	1 05 71	31						1M		
Bald Mt Creek	Lewisburg	7 07 71	42	100			200	2	1M		4
Neuse River	Raleigh	7 25 71	28	68	32	28	15,000	2	15M	4	
Tar River	Rocky Mount	8 15 71	33	65	35	17	15,000	2	700A	8	
Tar River	Rocky Mount	9 09 71	33	60	40		36,832	2	5M	5	
Tuckasegee River	Sylva	9 09 71	42	5	95		1,024	3	5M	2	
Pigeon River	Waynesville	5 31 71	23	1	99		5,000	2	20M	3	
Fourth Creek	Woodleaf	6 01 71	31								
OHIO											
E Fk Eagle Cr	Adams Co	11 08 71	28				141				
E Fk Eagle Cr	Adams Co	10 16 71	28				687				
Lt Threemile Cr	Adams Co	2 06 71	35				1,006				
Lt Threemile Cr	Adams Co	2 01 71	35				7,540				
Lt Riley Cr	Allen Co	6 23 71	28				1,518				
Jerome Fork	Ashland Co	12 07 71	42				6,396				
Trib Vermillion R	Ashland Co	12 14 71	44								
Hocking R	Athens Co	7 28 71	21								
Unnamed Pond	Athens Co	10 31 71	28				75				
Great Miami R	Butler Co	4 27 71	28				124				
Huff Run	Carroll Co	9 15 71	25				25,218				
Lt Darby Cr	Champaign Co	8 24 71	31				412				
Beaver Cr	Clark Co	6 08 71	28				41				
E Fk Honey Cr	Clark Co	7 15 71	28				308				
Hunter Cr	Clermont Co	5 23 71	28				77				
Leslie Run	Columbiana Co	7 17 71	21				208				
Longs Run	Columbiana Co	6 08 71	50				3,423				
W Fk Lt Beaver C	Columbiana Co	8 16 71	32				73,527				
Tusc & Musk R	Coshocton Co	9 12 71	23				679				
Sandusky R	Crawford Co	8 08 71	31				573				
Chagrin R	Cuyahoga Co	9 02 71	23				28				
Ludlow Cr	Darke Co	9 08 71	31								
Tiffin R	Defiance Co	9 11 71	22								
Big Walnut Cr	Delaware Co	4 26 71	31								
Pipe Cr	Erie Co	6 01 71	22				756				
Vermilion R	Erie Co	1 20 71	31				1,000				
Paw Paw Cr	Fairfield Co	8 13 71	23				100				
Sycamore Cr	Fairfield Co	9 08 71	13				118				
Big Walnut Cr	Franklin Co	10 20 71	31				148				
Blacklick Cr	Franklin Co	10 05 71	31				157				
Scioto R	Franklin Co	9 16 71	28								
Brush Cr	Fulton & Wms Co	9 29 71	31				32				
Barren Cr	Gallia Co	9 11 71	13				133				
Chicamuga Cr	Gallia Co	9 30 71	31				20				
N Br Caesars Cr	Greene Co	9 07 71	13				1,549				
Shawnee Cr	Greene Co	6 10 71	28								
Bank Lick Cr	Hamilton Co	12 11 71	32								
Blanchard R	Hancock Co	11 16 71	28				1,117				
Rt 235 Stream	Hancock Co	5 05 71	44				54				
Taylor Cr	Hardin Co	9 13 71	13				3,324				
Tr S Fk Turkey F	Henry Co	5 12 71	25								
Trib Five Mi Cr	Hocking Co	6 24 71	28								
Indian Trail Run	Holmes Co	4 13 71	22				56				
Indian Trail Run	Holmes Co	5 22 71	22								
Vermilion R	Huron Co	9 10 71	13								
Grand R	Lake Co	1 29 71	21				325				
Lake Erie	Lake Co	2 12 71	35				414				
N Fk Licking R	Licking Co	5 27 71	33				22				
N Fk Licking R	Licking Co	9 26 71	22				17,293				

TABLE 10—Report of Fish Kills, 1971—Cause Identified—Continued

Body of water	City or town	Date	Cause - see code page 32	Type of fish killed: Percent game	Type of fish killed: Percent non-game	Percent kill with commercial value	Estimated fish killed	Severity[1] see code page 32	Estimated miles or acres affected[2]	Duration: Days	Duration: Hrs.
Mad River	Logan Co	4 23 71	28	.		.	3,003				
Black R	Lorain Co	9 18 71	28				105				
Willow Cr	Lorain Co	7 15 71	32								
Maumee R	Lucas Co	10 06 71	31	.			131,245				
Swan Cr	Lucas Co	9 02 71	31				2,015				
Lt Sandusky R	Marion Co	10 26 71	11				661				
Great Miami R	Miami Co	9 01 71	22				54				
Great Miami R	Miami Co	10 24 71	31				22,889				
Great Miami R	Montgomery Co	9 23 71	23								
Great Miami R	Montgomery Co	9 10 71	31				548,076				
Great Miami R	Montgomery Co	1 15 71	33				7,045				
Allen Run	Morgan Co	4 04 71	25				1,295				
Chaps Run	Muskingum Co	3 25 71	28								
Thompson Run	Muskingum Co	7 23 71	21				15,741				
E Fk Duck Cr	Noble Co	9 28 71	21				32,678				
W Fk Duck Cr	Noble Co	8 23 71	21				224				
Flat Rock Cr	Paulding Co	10 16 71	31				51				
Flat Rock Cr	Paulding Co	9 02 71	31								
Flat Rock Cr	Paulding Co	11 17 71	31				4,761				
Prairie Cr	Paulding Co	10 18 71	28				15,870				
Scippo Cr	Pickaway Co	7 11 71	13				42,354				
Lt Cuyahoga R	Portage Co	3 01 71	25								
Trib Eagle Cr	Portage Co	8 16 71	31								
Elk Cr	Preble Co	9 09 71	13				1,723				
Four Mile Cr	Preble Co	4 21 71	12				486				
Four Mile Cr	Preble Co	9 08 71	13				4,233				
Seven Mile Cr	Preble Co	8 20 71	31								
Seven Mile Cr	Preble Co	1 16 71	31				408				
N Br Yellow Cr	Putnam Co	10 13 71	31								
Riley Cr	Putnam Co	6 08 71	31				8,691				
Tawa Run	Putnam Co	12 07 71	28								
W Black Fork	Richland Co	4 21 71	26				400				
Pond Lick Res	Scioto Co	6 04 71	28				3,403				
J A Thise Ditch	Seneca Co	7 23 71	22								
Morrison Cr	Seneca Co	5 24 71	50				250				
Rock Cr	Seneca Co	7 23 71	13								
Rock Cr	Seneca Co	7 11 71	28				63				
Turtle Cr	Shelby Co	9 04 71	13				148				
Black Run	Stark Co	7 25 71	32				675				
E Br Nimishillen	Stark Co	8 30 71	28				40				
Trib Mahoning R	Stark Co	5 25 71	22				25				
Turkey Foot Ca	Summitt Co	2 19 71	50				94				
Mahoning R	Trumbull Co	1 11 71	26				23				
Lt Stillwater Cr	Tuscarawas Co	8 31 71	41				60,281				
Pleasant Valley	Tuscarawas Co	9 04 71	13				2,600				
Pleasant Valley	Tuscarawas Co	9 11 71	13				2,536				
Mill Cr	Union Co	9 03 71	42				1,795				
Newmans Run	Warren Co	7 02 71	13				7,592				
Ritters Cr	Warren Co	6 14 71	13				118				
Shaker Cr	Warren Co	9 14 71	50				1,505				
Trib Lt Miami R	Warren Co	3 22 71	22				686	3			
Duck Cr	Washington Co	8 30 71	21				47,250				
Siegel Ditch	Williams Co	3 02 71	42				56				
Spring Run	Wyandot Co	4 17 71	31								
OKLAHOMA											
Skeleton Cr	Enid	1 12 71	25	9	91		22,818	3	62M	14	
Cottonwood Cr	Guthrie	2 06 71	42	2	98		35,040	2	7M		
N Canadian R	Oklahoma City	11 03 71	31	4	96		500	4	35M	1	
N Canadian R	Oklahoma City	8 16 71	24	1	99		171,370	2	8M	2	
Walnut Cr	Purcell	9 12 71	31	2	98		2,219	2	2A	1	
Manabee Cr	Shattuck	6 12 71	11	7	93		572		1M	2	
N Canadian R	Watonga	7 31 71	31	1	99		132,769		2M	1	
OREGON											
Ashland Creek	Ashland	9 09 71	33	100			200	2	1M		4
Refrigerator Cr	Crescent Lake	2 10 71	41	100			1,050	2	2M	3	
Gilbert Creek	Grants Pass	7 20 71	11	100			36	3	1M		2
Applegate River	Murphy	7 28 71	11	100			100	1	1M		1
PENNSYLVANIA											
Monogahela River	Belle Vernon	7 31 71	50	13	87		3,450	4	18M	2	
Hay Creek	Birdsboro	8 31 71	41	8	92		56,964	1	5M		24
Susquehana Riv	Bloomsburg	9 12 71	31	20	80		25,054	2	3M	2	
Tunungwant Creek	Bradford	8 06 71	24	33	67		52,980	1	3M	3	
Monocacy Creek	Brodhead	10 17 71	21	100			40	1	1M		6
Monocacy Creek	Broadhead	9 07 71	21	100			18	1	1M		3
Monocacy Creek	Brodhead	7 30 71	21	100			500	2	1M	2	
Monocacy Creek	Broadhead	7 24 71	21	100			100	2	1M	1	12
Fishing Creek	Columbia Co	7 23 71	11	27	73		7,324	1	4M	3	
Conneaut Creek	Conneautville	5 16 71	24	30	70		100,000	1	18M	2	
Trib-Whitney Run	Corry	9 12 71	13	10	90		500	2	1M	5	
Tr E Br Brndywin	Dowingtown	6 14 71	42		100		500	3	1M		24
Narrows Creek	Dubois	3 14 71	25	50	50		200	4	7M	7	
Lt Loyalsock Cr	Dushore	7 10 71	22	10	90		2,500	2	1M	1	
Sambo Creek	E Stroudsburg	9 03 71	50	10	90		4,074	1	3M	3	
Bonnie Brook	East Butler	1 16 71	24	1	99		32,081	2	6M	8	
Driftwood Branch	Emporium	8 19 71	33	50	50		1,066	2	1M		
Trib-Raystown	Everett	4 18 71	25	100			12	4	4M	6	
Cole Creek	Farmers Valley	11 12 71	25	25	75		100	4	1M		1
Willow Creek	Fleetwood	4 20 71	31	10	90		456	4	1M	1	

TABLE 10—Report of Fish Kills, 1971—Cause Identified—Continued

Body of water	City or town	Date	Cause[1] see code page 32	Type of fish killed: Percent game	Type of fish killed: Percent non-game	Percent kill with commercial value	Estimated fish killed	Severity[2] see code page 32	Estimated miles or acres affected[3]	Duration: Days	Duration: Hrs.
Smith Run	Franklin	1 07 71	28		100			4	1M		3
Beach Run	Fredricksburg	9 17 71	50	10	90		100	4	1M		6
Garland Run	Garland-Tarpedo	8 24 71	26	50	50		200	2	2M		4
Jacobs Run	Graysville	3 19 71	44	100			500	2	3M	3	
Kersher Creek	*Hamburg*	10 01 71	42	2	98		1,129	2	1M		24
Soucon Creek	Hellertown	3 30 71	21	100			100	3	4M	3	
Trib-Thorn Creek	Herman	5 24 71	25		100		1,440	2	2M	2	
Spring Creek	Houserville	4 28 71	24	47	53		6,140	1	5M		26
Towamencin Creek	Kulpsville	6 27 71	31	25	75		3,000	2	1M	1	
Spring Creek	Lewistown	1 11 71	25	10	90		112	4	1M	1	
Muddy Run	Limestoneville	8 18 71	42	75	25		3,000	1	2M	3	
Breakneck Creek	Mars	12 17 71	24	25	75		11,773	2	5M	3	
Breakneck Creek	Mars	4 07 71	24	20	80		5,404	1	3M	4	
Ten Mile Creek	Mather	9 13 71	31	50	50						
Ten Mile Creek	Mather	7 08 71	21	10	90		250	4	2M	2	
Mauses Creek	Mausedale	9 25 71	26		100		300	2	2M	2	
French Creek	Meadville	7 22 71	24	40	60		350,000	2	6M	2	
Van Horne Creek	Meadville	10 13 71	31	10	90		1,200	2	1M	1	
Trib to Pine Run	Merwin	10 07 71	24	50	50		1,000	1	3M		
Swatara Creek	Middletown	3 12 71	24	100			500	3	3M		10
Moscow Reservoir	Moscow	10 28 71	33	1	99		15,000	2	30A	2	
Mountain Creek	Mt Holly Sprngs	12 20 71	11	70	30		9,287	1	9M		24
Lt Chickies Cr	Mt Joy	8 18 71	13	20	80		5,407	1	6M	3	
Lt Chickies Cr	Mt Joy	5 15 71	31	50	50		1,662	2	3M		6
Breakneck Creek	Myoma-Butler Co	7 14 71	24	20	80		2,282	2	1M	1	
Lt Juniata Creek	New Bloomfield	9 02 71	50	90	10		3,000	1	1M	1	
Unk Trib-Big Run	New Castle	8 31 71	50		100		300	1	2M	2	
Allegheny River	Oakmount	7 15 71	21	2	98		20,000	2	30M	4	
Wolfkill Run	Petroleum Centr	5 12 71	44	1	99		212	2	3M	3	
Mahoning Creek	Punxsutawney	8 19 71	26	7	93		8,292	2	1M		4
Mahoning Creek	Punxsutawney	6 09 71	31	10	90		2,000	3	4M		4
Campbells Run	S Centre Twp	9 15 71	12		100		150	3	1M	2	
Trib to Thorn Cr	Saxonburg	6 26 71	27	1	99		10,336	2	4M	2	
Cayuta Creek	Sayre	7 30 71	31	20	80		16,476	1	2M		5
Honey Creek	Siglerville	9 07 71	34	40	60		80	4	1M		2
Lackawanna River	Simpson	7 29 71	26	20	80		2,750	2	2M		6
Big Trout Run	Slatington	10 22 71	42	25	75		34,447	1	2M		6
Run-Trib Gitts R	Smith Station	7 16 71	28	25	75		6,777	1	2M	6	
Coxes Creek	Somerset	9 09 71	25	10	90		1,120	3	3M		4
Muncy Creek	Sonestown	8 11 71	50	10	90		3,500	2	2M	1	
Conneaut Creek	Springboro	7 25 71	50	25	75		26,000	2	6M	2	
Valley Run	*Thorndale*	10 04 71	42	25	75		3,500	1	3M		12
So Br French Cr	Union City	6 08 71	42	40	60		189,166	2	12M	1	
Connonwingo Creek	Wakefield	9 08 71	50	20	80		2,016	2	2M		8
Monongahela Riv	West Mifflin	7 10 71	26	100			110	4	1M		3
Cowanesque River	Westfield	7 14 71	24	1	99		1,500	2	1M		
Cowanseque River	Westfield	6 04 71	28	50	50		1,625	2	1M		
Trib-Pennypack C	Willow Grove	11 01 71	25	100				4	2M		
Wind Gap Branch	Wind Gap	9 12 71	50	50	50		8,000	1	2M	5	
Wallace Run	Wingate	7 28 71	50	1	99		220	4	1M		6
Susquehanna Riv	York Haven	2 04 71	50	100			15,388	2	2M	2	
RHODE ISLAND											
Point Judith Pd	Wakefield	8 05 71	24		100		200	4		2	
Pawtuxet River	West Warwick	7 29 71	28				100	4	1M		4
SOUTH CAROLINA											
Fishing Creek	Rock Hill	6 29 71	31	10	90			3	12M		
SOUTH DAKOTA											
Roderick Dam	*Artesian*	5 01 71	11			100	5,000	2	10A	3	
Spit Rock Creek	Corson	6 05 71	13	20	80		300	2	3M	2	
Rapid Creek	Rapid City	8 10 71	31		100		5,000	2	3M	2	
TENNESSEE											
Comstock Creek	Bethesda	8 10 71	11	10	90		10,787	2	1M		12
White Horn Creek	Bulls Gap	5 21 71	41	1	99		45,198	3	3M	1	
Dale Hollow Lake	Byrdstown	8 01 71	21	2	98		2,000	4			
S Holt Fish Farm	Centerville	6 23 71	28			100	1,000	2	1A	1	
Tumbling Creek	Ernestville	6 28 71	42	1	99		1,025	4	1M		2
Norris Creek	Fayetteville	6 09 71	13	7	93		33,486	2	3M	3	
Caney Creek	Forbus	8 21 71	21	3	97		7,618	2	2M		6
Sinking Creek	Johnson City	5 13 71	24	1	99		1,162	3	2M	1	
Hurricane Creek	Lavernge	5 05 71	28	70	30		22,272	2	2M	2	
Rock Creek	Lewisburg	5 31 71	31	100			300	4			
Gibson Creek	Madison	2 26 71	31		100		200	4	1M	1	
Stones R-W Fork	Murfreesboro	11 22 71	31	60	40		31,728	2	4M	3	
Stones R-W Fork	Murfreesboro	9 01 71	31	19	81		18,255	2	2M		6
Stones R-W Fork	Murfreesboro	10 02 71	31	80	20		10,197	2	1M	1	
Melton Hill Lake	*Oak Ridge*	7 01 71	31		100		95	4	4A		6
Garrison Fork Cr	Wartrace	9 11 71	24	2	98		98,842	2	2M	2	
Trace Creek	Waverly	10 26 71	31	4	96		9,486	3	1M	2	
TEXAS											
Mustang Bayou	Alvin	2 04 71	50	5	95	10	200	1	4M	2	
Trinity River	Anahuac	7 15 71	31	5	95	80	3,000,000	2	5M		
Black Duck Bay	Raytown	7 02 71	31		100	50	2,000	4		1	
Hillebrant Bayou	Beaumont	8 04 71	31	80	20		1,000	3	3M	3	
Nolan Creek	Belton	4 17 71	31	30	70		5,000	1	2M	3	

TABLE 10—Report of Fish Kills, 1971—Cause Identified—Continued

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San Bernard Riv	Brazoria	6 04 71	50		100		1,000	4	1M	1	
Pecan Bayou	Brownwood	5 30 71	31					1		4	
Crystal Creek	Conroe	7 29 71	25					1			
Crystal Creek	Conroe	7 09 71	25	10	90		2,000	2	2M		
Ship Channel C C	Corpus Christi	6 15 71	44	50	50		500	4			
Rio Grande River	Del Rio	8 08 71	50	6	94		1,800	3	4M	4	
Dickinson Bayou	Dickinson	8 25 71	31	5	95	80	4,000,000	2	5M	5	
Dickinson Bayou	Dickinson	7 07 71	31	10	90	50	2,000,000	1	5M	1	
Dickinson Bayou	Dickinson	8 16 71	31	5	95	85	3,000,000	2	3M	1	
Magnolia Bayou	Dickinson	8 24 71	31	5	95	90	1,000	2	1M	1	
East Union Bayou	*Freeport*	5 28 71	31	2	98	2	2,350	2	1M	1	
Freeport Harbor	Freeport	10 06 71	50	30	70	60	105,600	2	2M	1	
Old Oyster Creek	Freeport	7 07 71	50	1	99		1,000	3	3M	1	
Clear Creek	Friendswood	3 03 71	24	80	20		400	1	5M		
Salt Creek	Graham	3 29 71	31	10	90		400	3	4M		
Bee Creek	Granbury	4 25 71	28	5	95		500	4	2M		8
North Bosque Riv	Iredell	4 24 71	50	30	70		4,000	2	2M	3	
Kings Creek	Kaufman	8 21 71	31	35	65	35			2M	4	
Johnson Creek	Kerrville	3 15 71	11	5	95		300	4	1M	1	
Clear Creek	League City	8 05 71	31		100	50	3,000	3	1M	2	
Day Lake	Liberty	6 01 71	25		100		100	4	1M	1	
Cedar Bayou	Mont Belvieu	2 11 71	50	1	99	30	14,000	1	11M	1	
Arkansas River	Rockport	9 16 71	50	70	30		1,000	4		1	
Trinity River	Rosser	5 19 71	31	35	65	50		2	269M	7	
Sabinal River	Sabinal	7 24 71	13	50	50		500,000	2			
Cibolo Creek	San Antonio	9 08 71	50		100		1,000	4		1	
Leon Creek	San Antonio	9 03 71	26		100		3,000	3		1	
San Antonio R	San Antonio	5 14 71	50		100		200	4	1M	1	
San Antonio Riv	San Antonio	1 11 71	24	10	90		100,000	2	2M		
Woodlawn Lake	San Antonio	7 12 71	24	10	90		200	4			
Taylor Bayou	Shoreacres	6 17 71	31	10	90	75	300,000	2	2M	1	
Taylor Bayou	Shoreacres	7 15 71	31		100		50	4	1M		
Taylor Bayou	Shoreacres	5 06 71	31					3	2M	1	
Drainage Canal	Texas City	7 22 71	31		100	100	150,000	2	1M		
Texas City Harbr	Texas City	10 08 71	27		100	10	700	4	5A	1	
Texas City Harbr	Texas City	9 27 71	27	3	97	90	5,000	2	10A	1	
Mission River	Woodsboro	8 08 71	11		100		2,500	4			
VERMONT											
Walloomsac River	Bennington	7 12 71	24	30	70		25,000	1	4M		5
Whetstone Brook	Brattleboro	8 24 71	24		100		3,000	1	1M		
Dog River	Northfield	7 28 71	31	25	75		10,000	2	2M		6
Black River	Springfield	7 20 71	24	1	99		2,500	3	2M		12
VIRGINIA											
Private Pond	Accomac	6 23 71	11	100			60	3	1A	2	
Little Otter R	Bedford	12 12 71	28	50	50		1,200	2	22M	30	
Broad Run	Chantilly	7 31 71	50					4			
Occoquan Res	Fairfax	6 29 71	33	70	30		9,310	2	4M	3	
Private Pond	Glenallen	5 09 71	13	100			1,100	2	16A	4	
N Fk Holston R	Saltville	7 13 71	24	65	35		20,788	2	8M	2	
N Fk Holston R	*Saltville*	8 28 71	24	95	5		2,306	3			
Tr Sf Shenandoah	Shuler	5 05 71	28		100		300	4	1M	1	
Wolf Cr	South Hill	8 17 71	13		100			4	1A	2	
Nansemond R	Suffolk	9 08 71	31	1	99		12,077	2	1M	1	
Private Pond	Tallysville	5 — 71	50	100				3	3A	2	
WASHINGTON											
Puget Sound	Anacortes	6 29 71	25					2	5M	30	
Beaver Creek	Bellingham	4 01 71	28	100				2	3M	99	
Chehalis River	Cosmopolis	5 03 71	28		100		100	4	1A	1	
Lake Creek	Forks	7 15 71	50	100			27	2	1M	2	
Cooke Creek	Kittitas	7 01 71	11		100						
Coal Creek	Longview	2 07 71	50	10	90		500	3	1M	2	
Capitol Lake	Olympia	6 22 71	50		100		500	3	6A	1	
Snake River	Pasco	4 — 71	50	100			5,011,400	2	70M	99	
Columbia River	Plymouth	5 26 71	35	100			100	4	1A		
Lake Sammamish	Redmond	2 08 71	28	60	40		150	4	1A	1	
Cedar River	Renton	8 20 71	50	100			50	4	1M	1	
Cowlitz River	Salkum	4 03 71	28	100			1,000	3	1M		2
Lake Washington	Seattle	6 01 71	24	100			1,000	3	1A	1	
Mathews Creek	Seattle	6 29 71	50	100			60	3	1M	1	
WEST VIRGINIA											
Glade Creek	Beckley	6 07 71	31	100			125	3		1	
Buckhannon River	Buckhannon	7 10 71	21	30	70		22,500	1	6M	2	
Middle Fk-Tygart	Cassity	6 22 71	21	50	50		1,500	1	3M	3	
Greenbrier River	Durbin	4 20 71	28	18	82		120,547	1	18M		8
Ohio River	New Martinsvill	7 09 71	24	5	95	4	5,000	3		1	
Charles Creek	Richwood	6 25 71	50		100		100	4	1M	1	
Guyandotte River	Stephenson	8 19 71	42	10	90		10,121	2	13M	2	
West Fork	Walkersville	8 28 71	28	10	90		500	2	2M		2
Toms Fork	West Union	8 03 71	42	20	80		14,779	2	1M	1	
Polk Cr-West Fk	Weston	6 07 71	21	70	30		23,000	2	3M	2	
Poplar Fork	Winfield	8 02 71	25	70	30		7,882	2	1M	1	
Private Ponds	Winfield	5 14 71	35	10	90		3,000	2	3A	1	
WISCONSIN											
Thompson Valley	Augusta	8 06 71	22	5	95		1,000	1	4M		15
Drainage Ditch	Bancroft	8 14 71	11	90	10		125	2	2M	2	
Isabelle Creek	Ellsworth	5 06 71	31	100			30	3	5M	2	

TABLE 10—Report of Fish Kills, 1971—Cause Identified—Continued

Body of water	City or town	Date	Cause[1] see code page 32	Type of fish killed: Percent game	Type of fish killed: Percent non-game	Percent kill with commercial value	Estimated fish killed	Severity[2] see code page 32	Estimated miles or acres affected[3]	Duration: Days	Duration: Hrs.
Milwaukee River	Grafton	1 20 71	28	1	99	.....	1,500	4	1M		
Rock Creek	Lake Mills	5 04 71	12	2	98	.....	.....	2	4M	1	
Pine River	Richland Center	6 29 71	31	2	98	.....	2,000	2	5M	1	..
Trib-Narrows Cr	Rock Springs	8 22 71	13	64	36	.....	125	3	5M	2	..
Echo Lake-Oneida	Sugar Camp	8 05 71	11	85	15	.....	250	2	30A	6	..
WYOMING											
Shoshone River	Cody	11 16 71	13	10	90	.....	12,000	1	3M	1	12

CODES

[1] 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 Operations
- 41 Rail
- 42 Truck
- 43 Barge or Boat
- 44 Pipe Line

50 Other Operations

[2] SEVERITY:
- 1 Complete
- 2 Heavy
- 3 Moderate
- 4 Light

[3] ESTIMATED MILES OR ACRES AFFECTED
- A = Acres
- M = Miles

Table 11 lists individual fish kills with causes not specifically identified.

TABLE 11—Report of Fish Kills, 1971—Cause Not Specifically Identified

Body of water	City or town	Date	Type of fish killed		Percent kill with commercial value	Estimated fish killed	Severity[1] see code page 35	[2] Estimated miles or acres affected	Duration	
			Percent game	Percent non-game					Days	Hrs.
CALIFORNIA										
Dominguez Channl	Carson	8 24 71		100		6,000	4	1M	1	12
Sacramento River	Dunsmuir	7 21 71	100			855	3	6M	1	
Unnamed Trib	Mendocino Co	4 21 71	100			20	4			
Salinas River	Monterey	3 27 71		100		800	3	3M		
Lake Merritt	Oakland	5 06 71	50	50		7,000	2	500A		
Briones Reservoir	Orinda	7 12 71	100			3,000	2	1000A	5	
San Leandro Bay	San Leandro	6 30 71	100			100	3	25A	1	
Fish Harbor-L A	San Pedro	1 22 71	5	95	5	10,100	3	5A		2
Fish Harbor-L A	San Pedro-La Co	10 21 71	5	95		10,000	3		21	
COLORADO										
Cedaredge Htchry	Delta County	8 05 71				40,000				
CONNECTICUT										
Roaring Brook	Glastonbury	5 22 71	100			300	2	2M		
Thames River	Montville	9 15 71		100	100	100,000	2	6M	6	
Quinnipiac River	New Haven	9 01 71		100	100	20,000	2	1M		
Muddy River	North Haven	11 30 71	60	40		300	4	1M		
Moosup River	Plainfield	11 05 71		100		100	4	3M		
Mt Riga Brook	Salisbury	5 06 71	90	10		200	2	1M		
Pine Brook	Wallingford	4 10 71	5	95		2,500	2	1M		
FLORIDA										
Santa Rosa Sound	Brooks Bridge	8 19 71		100	100	900	4	4M		24
E Arm Joes Bayou	Destin	8 10 71				9,000	2	120A		12
E Shore Escambia	Floridatown	6 23 71		100	100	44,000	2	1M		24
Hoffman Bayou	Hoffman Bayou	8 13 71		100	100	25,000	3	6A		24
Saddle Creek	Lakeland	2 01 71	80	20		835	1	1M	1	
Myakka Pk-Deep H	Myakka	1 15 71	83	17		1,220	3	1A		
Cinco Bayou	Okaloosa Co	8 20 71		100		350	4	2A		
Cinco Bayou	Okaloosa Co	8 19 71		100		600	4	2A		24
Cinco Bayou	Okaloosa County	8 15 71		100	100	350	4	1A		9
Bass Hole Cove	Santa Rosa Co	9 25 71				3,000,000	2	3M	3	
Bass Hole Cove	Santa Rosa Co	6 16 71				400	4	2A		18
Bass Hole Cove	Santa Rosa Co	9 22 71		100		4,500	3	1A		
Bass Hole Cove	Santa Rosa Co	6 18 71		100	100	750	3	1A		18
Bass Hole Cove	Santa Rosa Co	9 27 71				2,000,000	2	9M	16	
Bayou Chico	Santa Rosa Co	7 28 71		100	100	250	4	2A		24
Bayou Texar-Esc	Santa Rosa Co	9 22 71		100		400	4	1M		24
E Shore-Escambia	Santa Rosa Co	8 22 71				5,500,000	2	1A		24
E Shore-Naval Ai	Santa Rosa Co	9 30 71				350	4	3M		24
East Bay-Holley	Santa Rosa Co	9 29 71				45	4	2M		24
Escambia Bay	Santa Rosa Co	9 04 71			100	250,000	2	9M	3	
Escambia Bay	Santa Rosa Co	10 04 71				3,500	3			24
Escambia Bay	Santa Rosa Co	10 08 71				150,000	2	4M		24
Escambia Bay	Santa Rosa Co	9 24 71				10,000	3	9M	7	
Escambia Bay	Santa Rosa Co	9 29 71				2,500	3	7M		
Escambia River	Santa Rosa Co	8 14 71		100	100	250,000	2	2M		24
Floridatown Bech	Santa Rosa Co	9 22 71	100			200	4	1M		24
Hoffman Bayou	Santa Rosa Co	8 01 71		100	100	1,500	2	6A		
Hoffman Bayou	Santa Rosa Co	7 31 71		100	100	4,500	2	6A		
Hoffman Bayou	Santa Rosa Co	8 19 71				12,500	3	6A		24
Hoffman Bayou	Santa Rosa Co	8 20 71		100		250	4	2A		
Hoffman Bayou	Santa Rosa Co	7 27 71		100	100	1,750	3	6A		24
Judges Bayou	Santa Rosa Co	9 14 71		100		2,000,000	2	4A		24
Judges Bayou	Santa Rosa Co	10 13 71				500,000	2	9M		
Judges Bayou	Santa Rosa Co	10 11 71				2,500,000	2	36A		24
Judges Bayou-Esc	Santa Rosa Co	7 28 71				2,000,000	2	2M		24
Judges Bayou-Esc	Santa Rosa Co	7 29 71		100	100	9,000	2	640A		
Judges Bayou-Esc	Santa Rosa Co	7 24 71		100	100	2,000,000	2	2M		24
McMillians Bayou	Santa Rosa Co	9 18 71				1,250	3	2A		
Mulatto Bayou	Santa Rosa Co	8 13 71				250,000	2	4A		
Mulatto Bayou	Santa Rosa Co	9 12 71				2,000,000	2	10M	2	
Mulatto Bayou	Santa Rosa Co	9 19 71				75,000	2	3A		
Mulatto Bayou	Santa Rosa Co	8 12 71				2,000,000	2	4A		24
Mulatto Bayou-Ca	Santa Rosa Co	9 14 71		100	100	2,000,000	2	3A		24
N Escambia Bay	Santa Rosa Co	9 15 71				2,000,000	2	5M		24
Saltzman Bayou	Santa Rosa Co	7 25 71		100		2,000,000	2	2M		24
Saltzman Bayou	Santa Rosa Co	8 13 71				750,000	2	2M		24
Santa Rosa Sound	Santa Rosa Co	8 23 71		100		5,000	3	5M		24
HAWAII										
Pacific Ocean	Barbers Point	1 22 71						1M	1	
Ala Moana Pk Ca	Honolulu	3 24 71		100		8,000	2	1M		
Canal-Kuapa Pond	Honolulu	7 26 71		100		75	4	1M	1	
Kapalama Dr Ca	Honolulu	4 28 71		100		100	4	1M		
Mariners Cove	Honolulu	4 20 71		100	100	400	4	1M	1	
Maunalua Bay	Honolulu	7 01 71		100		500	4	2M	3	
Dr Ca Mokuleia	Honolulu County	5 03 71	50	50	50	200	1	1M	1	
Ulehawa Dr Canal	Waianae	8 27 71	44	56	44	180				
Honouliuli Pond	Waipahu	6 29 71	98	2	98	1,200	2			
ILLINOIS										
Indian-Cedar Crs	Abingoon	12 08 71	2	98	3	23,856	2	5M	2	
Copper Slough	Champaign	9 15 71	36	64	10	24,215	2	4M		
Mackinaw River	Colfax	9 03 71	3	97	2	63,920	3	2M		
So Br Kishwaukee	Dekalb	10 01 71	1	99	99	11,661	2	1M	1	
Buckhart Creek	Edinburg	4 10 71	14	86	7	13,165	3	12M	4	
So Br Kishwaukee	Genoa	12 06 71	1	99	41	57,671	3	23M	6	
So Br Kishwaukee	Kingston	4 28 71	2	98	96	6,683	2	3M	1	
Cedar Creek	London Mills	8 03 71	47	53	60	1,518	1	2M	1	
Aux Sable Creek	Minooka	6 01 71	1	99	50	22,843	2	1M	4	

TABLE 11—Report of Fish Kills, 1971—Cause Not Specifically Identified—Continued

Body of water	City or town	Date	Type of fish killed: Percent game	Type of fish killed: Percent non-game	Percent kill with commercial value	Estimated fish killed	Severity[1] see code page 35	[1] Estimated miles or acres affected	Duration: Days	Duration: Hrs.
Feather Creek	Muncie	9 29 71	1	99	2	5,649	4	1M		
Otter Creek	Otterville	7 25 71	20	80	42	14,245	2	5M	2	
INDIANA										
Pipe Creek	Frankton	8 25 71		100		1,000	3	3M		
Reagan Creek	Mechanicsburg	9 06 71	5	95		152	3			
Ripley Creek	Sunman	7 27 71	5	95		398	2	10M		
KANSAS										
J Redmond Resrvr	Burlington	5 24 71	80	20	80	6,000	4			
Cowskin Creek	Haysville	8 04 71	5	95	20	5,000	1	1M	1	
Cowskin Creek	Haysville	6 07 71	15	85	40	3,000	1	2M	3	
Marion Reservoir	Marion	12 51 71	25	75	35	18,860	4		15	
Indian Creek	Overland Park	7 18 71	10	90	10	200	3	2M	2	
S FK Ninnescah R	Pratt	5 21 71	15	85	40	7,500	3	5M		18
LOUISIANA										
Bayou Flaggon	Alexandria	6 10 71	50	50	25	3,000	2	3M		
Bayou Gr Caillon	Dulac	8 06 71	20	80	80	1,000	3	3M		6
Bayou Manchac	Hope Villa	9 23 71	25	75	50	5,000	2	11M		
Red River	Moncla	2 07 71	10	90	90	300	4	15M	1	
Bayou Bonfouca	Slidell	8 25 91	50	50	20	500	4	1M		12
Weeks Bay	Weeks Island	8 19 71		100	100	500	4	1000A	1	
Westwego Dr Ca	Westwego	7 12 71		100		1,000	2	1M	1	
MAINE										
Aroostock River	Washburn	6 02 71		100			4			
MARYLAND										
Jones Creek	Baltimore	11 09 71				2,000				
MASSACHUSETTS										
Quahog Pond	West Falmouth	8 04 71	100		100	102	3	7M		48
Mill Creek	Yarmouth	8 21 71		100			2	2M		
MICHIGAN										
Black River	Croswell	6 14 71		100		75	4	2M	1	
MISSOURI										
Petite Saline Cr	Booneville	6 12 71	40	60		12,750	2	5M		
Beeler Creek	Cabool	4 20 71								
E Fork Wakenda R	Hardin	6 05 71				1,000	1	2M		
Frene Creek	Hermann	8 12 71	16	84		6,000	3	1M		
Flat Creek	Sedalia	11 28 71	6	94		4,000	2	1M		
Dodge Creek	St Genevieve	7 01 71	20	80			2	3M		
NEBRASKA										
Republican River	Cambridge	6 23 71		100			3	16M	2	
Johnson Reservoir	Lexington	6 24 71	94	6		1,275	4		2	
NEW JERSEY										
Atlantic Cty Rsr	Absecon	6 08 71	10	90		200	4	1M	1	
Whippany River	Cedar Knolls	6 08 71		100		25	4			
Rocky Brook	Hightstown	7 08 71	1	99		30	4	1M		10
N Br Rockaway Cr	Lebanon	4 19 71		100		60	4	1M		12
Lopatcong Creek	Lopatcong Twp	9 06 71		100		50	4	1M		4
Macs Pond	Manasquan	7 19 71				50	4			
Petticoat Brook	Millville	7 22 71		100		100	4			
Watnong Brook	Morris Plains	5 19 71	2	98		100	3	1M	1	
Ottens Canal	North Wildwood	7 10 71		100			3	1M	20	
Lake Carnegie	Princeton	6 01 71				100	4	1M		10
Lake Riconda	Ringwood Boro	5 02 71	1	99		450	2	13A	2	
Rahway River	Springfield	7 14 71		100		50	4	4M		
Pohatcong Creek	Washington	7 23 71		100		50	4			
NEW MEXICO										
Pecos River	Artesia	6 24 71	15	85		8,000	1	6A	3	
Pecos River	Tererro	7 02 71	100			1,000	2	2M	3	
NEW YORK										
Tonawanda Creek	Batavia	8 10 71		100		200	4	1M		2
Cayuga Creek	Buffalo	6 28 71		100		4,500	3	1M		12
Tioga River	Lindley	9 13 71	20	80		25,000	2	8M	2	
Allen Creek	Rochester	7 21 71	30	70		2,000	2	5M	2	
Chautauqua Creek	Westfield	10 14 71	1	99		500	3	1M		8
NORTH CAROLINA										
Deep River	Jamestown	6 08 71	25	75		1,500	3	1M		6
City Lake	Rocky Mount	4 22 71		100		175	4	6A	2	
Rocky River	Siler City	7 17 71		100		100	4	1M		
OHIO										
Trib Jerome Fk	Ashland Co	7 01 71				479				
Four Mile Cr	Athens Co	3 25 71				170				
Auglaize R	Auglaize Co	7 07 71				239				
St Marys R	Auglaize Co	8 09 71				110				
Dicks Cr	Butler Co	8 21 71				1,297				
Todds Fk	Clinton Co	7 30 71				1,207				
Mill Cr	Delaware Co	9 21 71				269				
Trib Hocking R	Fairfield Co	5 23 71				134				
Blacklick Cr	Franklin Co	6 21 71				89				

TABLE 11—Report of Fish Kills, 1971—Cause Not Specifically Identified—Continued

Body of water	City or town	Date	Type of fish killed: Percent game	Type of fish killed: Percent non-game	Percent kill with commercial value	Estimated fish killed	Severity[1] see code page 35	[2]Estimated miles or acres affected	Duration: Days	Duration: Hrs.
Scioto R.	Franklin Co	7 30 71				5,000				
Old Town Run	Greene Co	7 31 71				3,218				
Shawnee Cr.	Greene Co	4 13 71				60				
Lt Miami River	Hamilton Co	4 26 71				1,419				
W Fk Mill Cr.	Hamilton Co	7 18 71				275				
Grand R.	Lake Co	9 16 71				816				
Trib French Cr.	Lorain Co	5 04 71								
Wahoo Run	Madison Co	9 30 71				98				
Trib St Marys R.	Mercer Co	10 06 71				30				
Great Miami R.	Miami Co	9 10 71								
Great Miami R.	Montgomery Co	9 22 71				111				
Great Miami R.	Montgomery Co	5 24 71				100				
Great Miami R.	Montgomery Co	12 28 71				21,870				
Muskingum R.	Morgan Co	10 27 71				1,000				
Trib W Branch	Morrow Co	10 01 71				31				
Muskingum R.	Muskingum Co	8 20 71				85,809				
Seven Mile Cr.	Preble Co	4 06 71								
Loramie Cr.	Shelby Co	9 06 71				1,721				
Nine Mile Cr.	Shelby Co	9 21 71				275				
W Br Nimishillen	Stark Co	9 04 71				46				
Mud Run	Summit Co	7 23 71				21				
Newman Run	Warren Co	6 22 71				710				
OKLAHOMA										
Little Sandy Cr.	Ada	4 07 71	34	66		2,092	1	3M		
Keystone Res	Cleveland	8 03 71	14	86		37,960	4	3200A	14	
Cimarron R.	Cushing	6 03 71	6	84		67,940	2	20M	2	
Cimarron R.	Perkins	3 15 71	47	53		17,065	3	53M		
PENNSYLVANIA										
Little Pine Cr.	Etna	6 05 71		100		750	3	1M		
Trib-Valley Cr.	Exton	10 06 71	30	70		2,950	2	2M	90	
Powers Run	Johnsonburg	5 22 71	4	96		50	4	1M	1	
Buffalo Creek	Lewisburg	8 31 71	20	80		20,634	2	2M	2	
Byron Sachs Pond	Mountain Top	7 02 71	100			15	3	1A		4
Tulpehocken Cr.	Myerstown	6 29 71	12	88		200	4	5M	2	
Iron Run	St Marys	9 03 71	50	50		1,000	2	1M	1	
E Mahoning Creek	Troutville	3 23 71	100			150	4	2M	2	
Bald Eagle Creek	Tyrone	7 19 71	99	1		1,000	1	1M	2	
Kiwanis Lake	York	6 16 71	100			15	4	1A	2	
TENNESSEE										
Hatchie River	Ripley	6 06 71	16	84	15	1,974	2	5M	12	
TEXAS										
Oyster Bayou	Anahuac	6 28 71	1	99	99	1,993,200	2	2M	1	
Trinity Bay	Baytown	4 26 71	5	95		200	4	1M	1	
Hurricane Levee	Freeport	3 24 71	30	70	60	25		3M		
Surfside Beach	Freeport	1 09 71	2	98	2		4	1M	2	
Sun Oil "Slip"	Gilcrist	6 14 71		100	100	1,000,000	2	1M	1	
Paluxy River	Glen Rose	7 10 71	50	50		1,200	2	1M	1	
Big Creek	Guy	8 08 71	20	80		500	3	5M		
Sulfur Creek	Lampasas	6 04 71	5	95				1M	1	
Old River	Mont Belvieu	7 23 71	2	98		400	3	1M		
Cow Bayou	Nassau Bay	9 20 71		100	50	3,500	3	1M	1	
Atascosa River	Pleasanton	9 13 71		100		1,000	4		1	
Leon Creek	San Antonio	5 14 71		100		100	4	1A	1	
San Antonio R.	San Antonio	5 07 71		100		300	4	1M	1	
San Pedro Creek	San Antonio	5 04 71		100		400	4	1M	1	
Oyster Creek	Sugarland	5 14 71	5	95	3	150	4	1M		4
Bosque River	Waco	5 21 71	50	50		5,000	2	1M	2	
Lake Arrowhead	Wichita Falls	4 21 71	95	5		300		15A	5	
UTAH										
Irrigation Ditch	Provo	7 28 71	100			110	3			
WASHINGTON										
Kelsey Creek	Bellevue	10 28 71	100			50	2	1M	2	
Chico Creek	Bremerton	9 02 71								
Lake Tapps	Buckley	6 20 71	5	95		3,000	3	1A	1	
Puget Sound	Coupeville	10 13 71	90	10			3	1M	4	
Ohop Creek	Eatonville	7 23 71	50	50						
Stevens Creek	Humptulips	7 14 71	100				4	1M	1	
Mill Creek	Kent	9 08 71	3	97		5,716	2	4M	1	
Clarks Creek	Puyallup	3 29 71	50	50		100	3			
Lake Sammamish	Redmond	2 04 71	90	10		100	4			
Black River	Benton	2 02 71	25	75		100	4		1	
Becker Creek	Ryderwood	4 27 71	100				2	9M	99	
Shelton Creek	Shelton	10 05 71	90	10		100	2	1M	1	
Shelton Creek	Shelton	7 29 71	90	10		300	2	1M	1	
Shelton Creek	Shelton	10 12 71	90	10		20	4	1M	1	
Peone Creek	Spokane	10 22 71	32	68		914	2	2M	1	
Cowiche Creek	Yakima	8 09 71	3	97		1,434	2	2M	1	
Spring Creek	Yakima	3 24 71	5	95			3	1M	1	
WEST VIRGINIA										
Kanawha River	Charleston	9 05 71	90	10		1,000	3	3M	1	
WISCONSIN										
Wolf River	Stanley	6 18 71	10	90		1,500	1	1M		

CODES

1 SEVERITY:
- 1 Complete
- 2 Heavy
- 3 Moderate
- 4 Light

2 ESTIMATED MILES OR ACRES AFFECTED
- A Acres
- M Miles

Alabama Department of
Conservation
Fisheries Section
Montgomery, Alabama

Arkansas Game and Fish
Commission
Division of Fisheries
Little Rock, Arkansas

California Department of Fish
and Game
Environmental Services
Sacramento, California

Colorado Game, Fish and Parks
Denver, Colorado

Connecticut Board of Fisheries
and Game
Fisheries Division
Hartford, Connecticut

Delaware Water and Air
Resources Commission
Dover, Delaware

Division of Game and
Fresh Water Fish
Tallahassee, Florida

Georgia Game and Fish
Commission
Atlanta, Georgia

Hawaii Department of Land and
Natural Resources
Division of Fish and Game
Honolulu, Hawaii

Idaho Fish and Game
Department
Fishery Management
Boise, Idaho

Illinois Department of
Conservation
Division of Fisheries
Springfield, Illinois

Indiana State Board of Health
Division of Water Pollution Control
Indianapolis, Indiana

Iowa State Conservation
Commission
Des Moines, Iowa

Kansas Forestry, Fish and Game
Fisheries Division
Pratt, Kansas

Kentucky Department of Fish and
Wildlife Resources
Division of Fisheries
Frankfort, Kentucky

Louisiana Wildlife and Fisheries
Commission
Division of Water Pollution Control
Baton Rouge, Louisiana

Department of Inland Fisheries
and Game
Fishery Research and Management
Augusta, Maine

Maryland Department of
Water Resources
Annapolis, Maryland

Massachusetts Department of
Natural Resources
Division of Marine Fisheries
Boston, Massachusetts

Department of Natural Resources
Water Resources Commission
Lansing, Michigan

Minnesota Department
of Conservation
Division of Game and Fish
St. Paul, Minnesota

Missouri Department
of Conservation
Division of Fisheries
Jefferson City, Missouri

Missouri Department
of Conservation
Columbia, Missouri

Montana State Fish
and Game Commission
Helena, Montana

Nebraska Game Forestation
and Fisheries
Lincoln, Nebraska

Nevada Fish and
Game Commission
Reno, Nevada

New Hampshire Water Supply and
Pollution Control Commission
Concord, New Hampshire

State of New Jersey
Bureau of Fisheries Laboratory
Lebanon, New Jersey

Department of Environmental
Conservation
Albany, New York

New Mexico Department of
Game and Fish
Sante Fe, New Mexico

North Carolina Department of
Water and Air Resources
Industrial Waste Section
Raleigh, North Carolina

Ohio Department of
Natural Resources
Division of Wildlife
Columbus, Ohio

Oklahoma Department of
Wildlife Conservation
Fisheries Division
Oklahoma City, Oklahoma

Oregon State Game Commission
Lake and Stream Management
Portland, Oregon

Pennsylvania Fish Commission
Harrisburg, Pennsylvania

Rhode Island Department of
Natural Resources
Providence, Rhode Island

South Carolina Wildlife Resources
Division of Fish and Game
Columbia, South Carolina

South Dakota Department of
Game Fish and Parks
Pierre, South Dakota

Tennessee Game and
Fish Commission
Fish Management Division
Nashville, Tennessee

Texas Parks and
Wildlife Department
Austin, Texas

Utah Department of
Natural Resources
Division of Fish and Game
Salt Lake City, Utah

Vermont Fish and
Game Department
Fish and Game Commissioner
Montpelier, Vermont

Virginia State Water Control Board
Richmond, Virginia

Washington State Water Pollution
Control Commission
Olympia, Washington

West Virginia Department of
Natural Resources
Division of Fish and Game
Charleston, West Virginia

Wisconsin Department of
Natural Resources
Madison, Wisconsin

Wyoming Game and
Fish Commission
Cheyenne, Wyoming