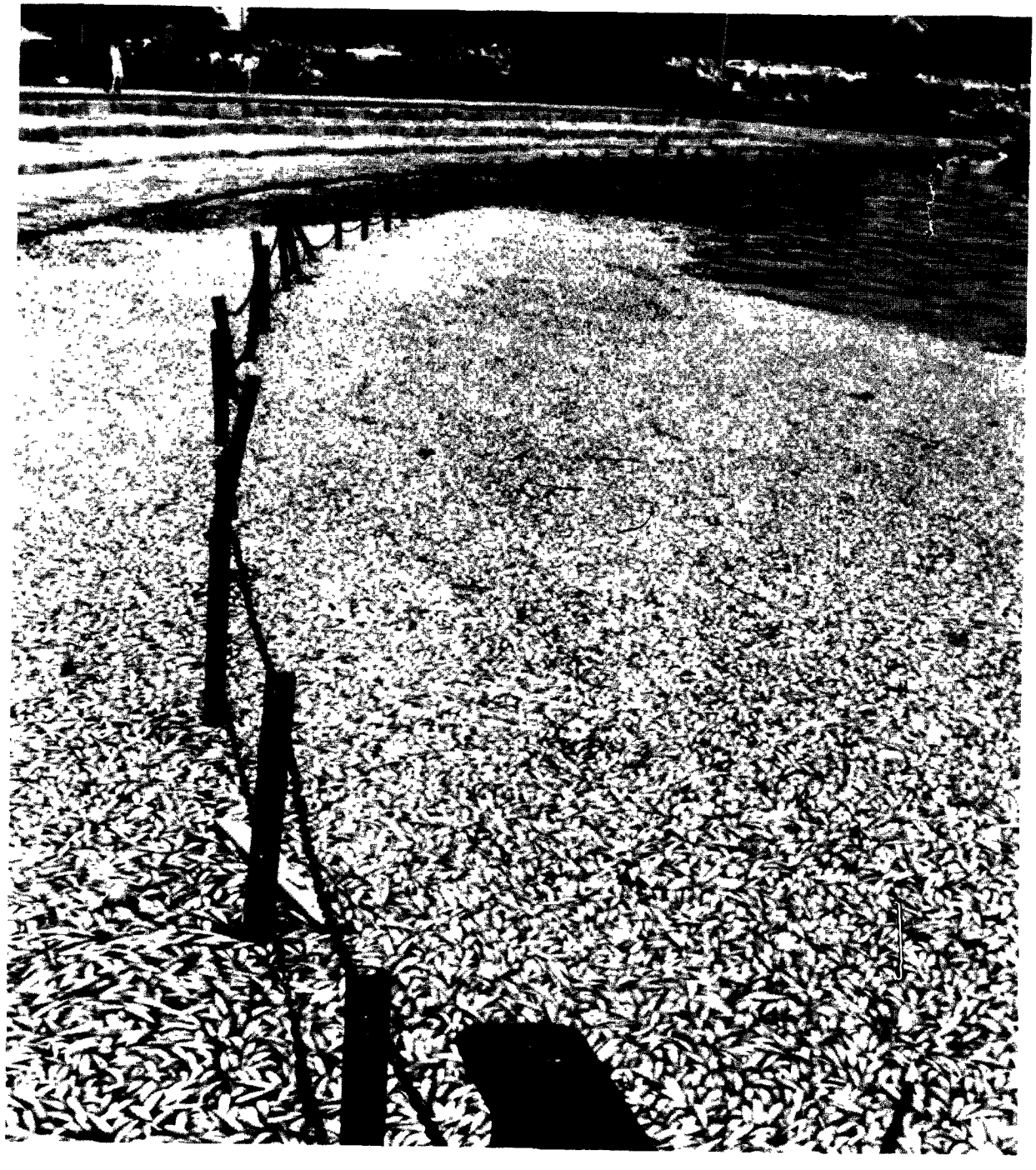
EPA-440/9-70-001

FISH KILLS

Caused by Pollution in 1970



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1970 FISH KILLS

ELEVENTH ANNUAL REPORT

ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF WATER PROGRAMS
DIVISION OF APPLIED TECHNOLOGY
TECHNICAL DATA
AND INFORMATION BRANCH
WASHINGTON, D.C. 20460

Introduction

About 23 million fish were reported killed by water pollution in 1970 in 634 separate incidents in 45 States. Of the five States not reporting fish kills, Nevada and New Mexico advised that no known kills were caused by pollution in 1970; and Maryland, Mississippi, and Ohio provided no information.

The number of fish kill reports increased 36 percent in 1970 compared to 1969. This can be related to increased cooperation from State reporting officials, improved reporting practices, and increased public awareness of pollution-caused fish kills.

With the exception of 1969, the reported number of fish killed in 1970 was 40 percent greater than the number reported for any year since the annual census of fish kills began in 1960. In 1969, one kill of 26.5 million in Lake Thonotosassa at Plant City, Florida, accounted for 64.6 percent of the total of 41 million fish killed.

Since 1961, a total of 161 million fish have been reported killed by pollution in 4,548 separate incidents (Figure 1). Information for 1960 was not included since data for these reports were collected from June to December, only. Data were gathered from visual sightings and do not include fish that could not be identified after death.

The annual fish kill report represents the combined efforts of private individuals, State fish and game officers, and pollution officials directly aimed at protecting fish and water quality. Usually, a fish kill is first noticed by a fisherman, camper, or other private citizen, who initiates the reporting process by contacting a State warden immediately, or a conservation, or health official in charge of the area. The State agency then sends trained technical investigators to investigate and identify the source and nature of the pollutant responsible for the fish kill. Information collected by the State is sent to the Technical Support Division of the Environmental Protection Agency for interpretation and publication.

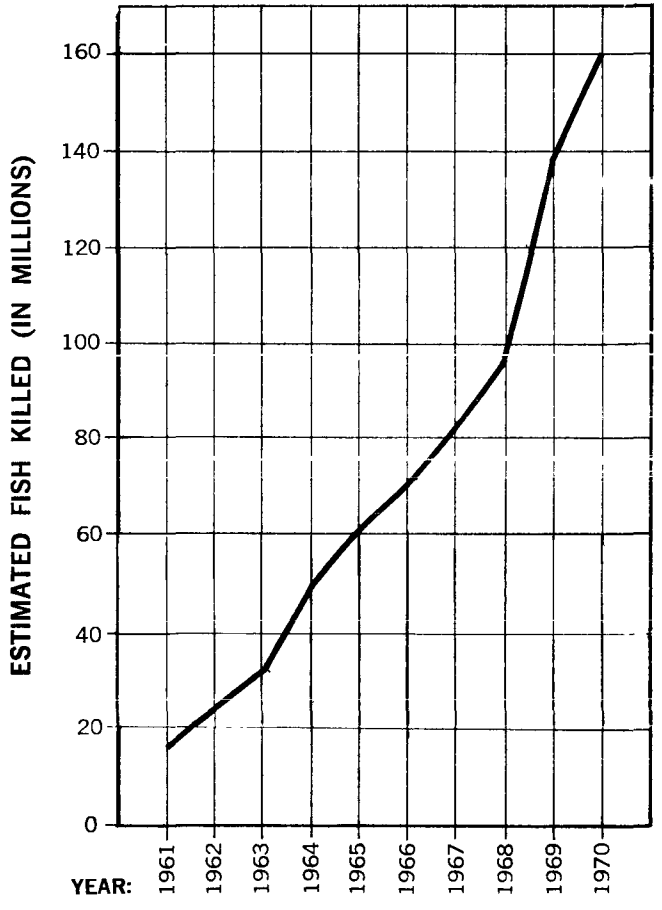
There were 31 reported kills where the number of dead fish equaled or exceeded 100,000; five of these kills reached or exceed the million mark (Table 1). Industrial pollution continued to be the most frequent cause of fish kills with 213 reports for 1970 accounting for more than 9.8 million fish killed. Municipal pollution was the second most frequent cause of fish kills with 119 reports for 1970 accounting for 6.6 million fish killed.

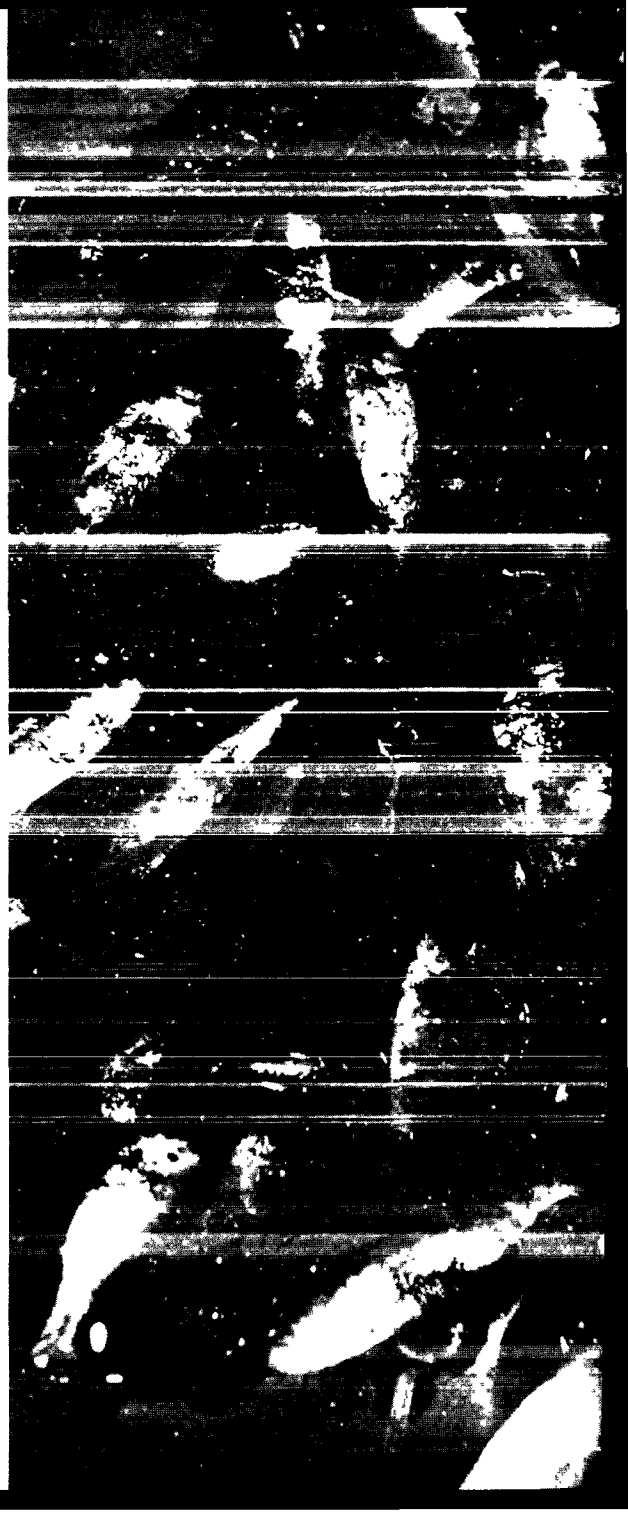
One million or more fish were killed in: the Dog River in Alabama with 3,240,000 killed by discharges from sewerage systems; the San Jacinto River, Texas, with 2,700,000 killed by a combination of industrial pollutants; the Delta Mendota Canal, California, with 2,500,000 killed by sewerage system wastes; Camille Creek—Lakes, Georgia, with 2,000,000 killed by sewerage system wastes; and Freeport Harbor, Texas with 1,000,000 fish killed by unidentified pollutants.

AN INCREASING REPORTED RATE OF FISH KILLS . . .

. . . over a 10 year period is indicated by Figure 1 This graph is a cumulative summary of estimated fish kills reported for 1961 through 1970. The first reporting year, 1960, was excluded since reports were not received for the full year.

Figure 1
CUMULATIVE DISTRIBUTION OF ESTIMATED FISH KILLED 1961 TO 1970





Review of 1970 Data

Of the 634 reports submitted, 560 contained estimates of the number of fish that died (Table 3). In the remaining 74 reports, fish losses were expressed in general terms such as thousands or pounds. These 74 reports were assigned values based on averages from 529 fish kill reports in which less than 100,000 fish were reported killed. The total of the 560 reports containing fish kill estimates, plus the computed fish kill estimates for the 74 reports brought the 1970 fish kill total to 22,760,820.

Another 139 fish kills were reported but the cause of these deaths could not be accurately determined. Kills from undetermined causes are listed in Table 13 as Cause Unknown. Deaths from natural causes, disease, low water, winter freeze-outs, entrapments, etc., are not used in this report even though a card may be submitted for such losses.

The average size of the 1970 fish kills was 6,412, up from the 1969 average size of 5,860 (Table 2). As in previous annual reports, averages were derived after eliminating as unrepresentative those reports of 100,000 or more fish killed (Table 1). A full list of fish kills due to identifiable causes is given in Table 12.

Kills caused by transportation operations had the highest average with 9,200 fish per kill reported, followed by 7,000 fish per kill for municipal operations, 6,400 fish per kill for industrial operations, and 6,270 fish per kill for agricultural operations (Table 3).

TABLE 1—MAJOR KILLS—100,000 OR OVER

Lake or stream	Near or in	State	Number of fish	Operation
Industrial Canal	Mobile	Alabama	114,148	Food Products
Dog River	Mobile	Alabama	3,240,000	Sewerage System
Dog River	Mobile	Alabama	800,000	Unknown
Locust Fork	Powhatan	Alabama	481,200	Combination
Silver Bay	Sitka	Alaska	500,000	Paper Products
Verde River	Camp Verde	Arizona	129,199	Poisons
Delta Mendota Ca	Los Banos	California	2,500,000	Food Products
Dominic & Rowdy	Smith River	California	100,000	Chemicals
Tuolumne River	Stanislaus Co	California	500,000	Other Industrial
Griffin Pd-Priv	Lakeland	Florida	120,300	Manure Drainage
Camille Cr-Lakes	Augusta	Georgia	2,000,000	Sewerage System
St. Joe River	Avery	Idaho	235,000	Rail Transportation
Labette Creek	Parsons	Kansas	100,000	Manure Drainage
Crooked Creek	Troy	Missouri	349,000	Other Operations
Drainage Canals	Swan Quarter	North Carolina	750,000	Poisons
Cimmaron River	Cushing	Oklahoma	171,000	Combination
W Br Susquehanna	Jersey Shore	Pennsylvania	238,850	Mining
Shoal Creek	Lawrenceburg	Tennessee	111,397	Metals
McKellar Lake	Memphis	Tennessee	100,100	Sewerage System
New Bayou	Alvin	Texas	111,000	Unknown
Scott Bay	Baytown	Texas	250,000	Combination
San Jacinto R	Channelview	Texas	2,700,000	Combination
Dickinson Bayou	Dickinson	Texas	219,000	Unknown
Freeport Harbor	Freeport	Texas	1,000,000	Unknown
Mouth Dischg Ca	Glen Cove	Texas	772,000	Other Industrial
Houston Channel	La Porte	Texas	500,500	Other Operations
Moses Lake	Texas City	Texas	300,000	Sewerage System
Moses Bayou	Texas City	Texas	100,000	Sewerage System
Colville River	Chewelah	Washington	145,000	Poisons
Upper Mud Lake	Madison	Wisconsin	140,000	Sewerage System
Moccasin Creek	Wisc Rapids	Wisconsin	100,000	Chemicals

Source of Kills

In 1970, industrial operations were responsible for approximately 9.6 million fish killed based on 177 reports specifying numbers of fish killed (Figure 2). This

major pollution source was the largest single fish killer. In 1969, industrial operations also were the leading killer with approximately 28.7 million fish killed based on 166 reports.

In 1970, municipal operations killed approximately 6.6 million fish (Figure 2) based on 109 reports, which placed this source as the second leading cause of fish kills in 1970. In 1969, municipal operations killed approximately 1.2 million fish based on 73 reports specifying the number of fish killed. This source ranked fifth in 1969, indicating a significant increase in reports, as well as fish killed over a 1-year period.

In 1970, other operations killed approximately 3.8 million fish based on 153 reports. In 1970, other operations ranked third as a source of fish deaths. In 1969, other operations killed approximately 2.5 million fish; 1969 ranking was also third in relation to other major sources. Other operations include pollutants from highway and building construction, airport and service station operations, and mosquito control.

In 1970, agricultural operations killed approximately 1.8 million fish based on 95 reports specifying the number of fish killed, which placed this source fourth as a leading killer of fish. In 1969, agricultural operations killed approximately 6.3 million fish and was the second ranking fish killer. Agricultural operations fish kills for 1969 are based on 92 reports specifying the number of fish killed.

In 1970, transportation operations killed approximately 0.5 million fish and was the fifth ranking killer of fish based on 26 reports specifying numbers of fish killed. In 1969, transportation operations killed approximately 2.1 million fish, and ranked fourth. Fish kills caused by transportation operations occur, for example, when a pipeline springs a leak sending its oil flowing into streams, or when a truck or railroad tank car overturns, spilling its lethal cargo into a waterway.

The reported number of fish killed is given for each identified source of pollution in Figure 3.

Of the approximately 22.8 million estimated fish killed in 1970, approximately 4.4 million fish were listed as game fish (Table 3). The remaining 18.4 million fish were non-game or of commercial value only.

Table 2 contains historical data for the eleven 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 2—Historical Summary of Pollution-Caused Fish Kills, June 1960—December 1970

June-December	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Number of States reporting	38	45	37	38	40	44	46	40	42	45	45
Number of reports	286	411	381	436	485	531	436	375	438	465	634
Reports which state number of fish killed	149	263	233	300	385	446	372	303	379	382	560
Total estimated number of fish killed*.	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	22,760,820
Average size of kill***	2,925	6,535	5,710	7,775	5,490	4,310	5,620	6,460	6,015	5,860	6,412
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
Reports where extent of area affected was stated											
River:											
Number of reports	189	240	259	271	339	292	251	219	264	356	487
Miles of stream	1,204	1,686	1,448	2,203	1,440	1,300	989	1,039	1,565	2,358	1,865
Lakes and reservoirs:											
Number of reports	25	50	25	49	57	38	46	33	37	98	111
Acres affected	1,407	5,967	2,581	5,644	12,637	4,630	21,564	1,996	2,400	6,068	33,168
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**

* Includes all fish killed reported plus an allowance computed for reports which do not indicate the number of fish that died.
** After adjustment for reports giving two or more causes. *** Derived after excluding reports of 100,000 kills or more as being unrepresentative.

Duration, Severity, and Location of Fish Kills in 1970.

All reports do not indicate duration of kill. In 1970, 64 percent (408 reports) indicated duration of kill with an average of 3.25 days (Table 8). In 1969, 57 percent (268 reports) indicated duration with an average of 3.11 days (Table 2). The longest lasting pollution incident, on the Heart River at Dickinson, North Dakota, required 98 days for all fish to be killed. However, the majority of the kills—214—lasted one day or less. Of these 214 fish kill reports, industrial operations were charged with 57 kills, municipal operations with 46 kills, other operations with 58 kills, agricultural operations with 45 kills, and transportation operations with 8 kills (Table 11).

Measurements of fish kill severity are reported as complete, heavy, moderate, or light (Table 9). One hundred reports of complete kills accounted for 2.5 million fish averaging 6,800 fish per kill. Heavy kills, reported on 222 cards, accounted for 18.2 million fish killed with an average of 13,270 fish per kill. Moderate kills, reported on 127 cards, accounted for 1.25 million fish killed with an average of 4,200 fish per kill. Light kills were reported 116 times accounting for 94,320 fish killed, averaging 835 fish per kill. The number and percentage of fish kill reports is given jointly for severity of kill and major cause of pollution in Table 10.

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 pollutional effect. Almost 80 percent of the 22 million fish reported killed in 1970 were killed between May and September. July had the greatest number of fish kill reports (108) with over 3½ million fish reported killed based on 95 reports specifying number of fish killed. August, with 95 fish kill reports, had the greatest fish loss for a single month with 6 million fish killed based on 87 reports. Other highs were May with 83 reports, 71 of which gave a total reported fish kill of approximately 4.9 million fish; June with 86 reports, 81 of which gave a total reported fish kill of approximately 0.9 million fish; and September with 79 reports, 70 of which gave a total reported fish kill of approximately 2.1 million fish. An unusually high number of fish (2.7 million) were reported killed during January; 2.5 million of these fish were included in a single kill.

Of the 633 fish kills reported in 1970, 487 were in rivers with a loss of over 13 million fish involving 1,865 miles of stream (Tables 4 and 5). Lake kills occurred in 33,000 acres of water with over 3 million fish killed in 111 incidents. Coastal area kills totaled 36, involving more than 6 million fish along 11,700 miles of shorelines. The number of fish kill reports and the number of fish reported killed by type of water (fresh, salt, and estuary) is indicated in Table 6.

Adequacy of Fish Kill Reporting

Since numerous small kills resulting from pollution go unnoticed or unreported, the annual census of fish kills cannot be considered complete. Moreover, significantly large kills are occasionally not included because of lack of information which would indicate that the kills were produced by pollutants.

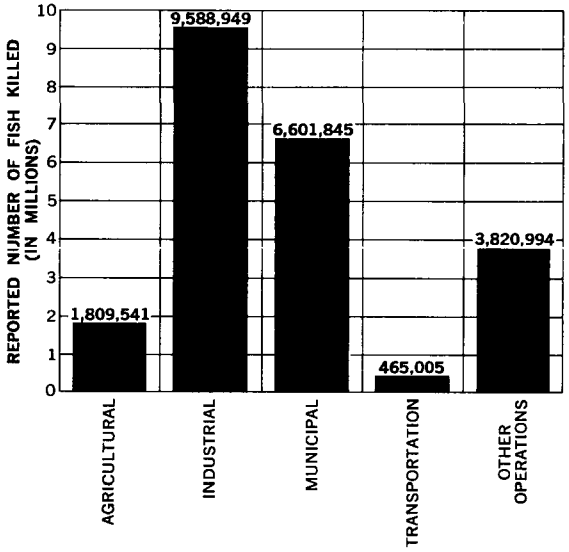
The value and success of the reporting by the States depend generally on two factors: (1) the State agency's administrative capability to respond to and investigate reported kills, and (2) the cooperation of fishermen and other individuals along lakes or streams in reporting a fish kill to local authorities as soon as it is discovered. In most cases, even a short time lapse between discovery and investigation of a fish kill spells the difference between a full and accurate report and incomplete findings that limit the value of the information.

Printed report cards and suggested guidelines for filling out the cards are provided to State investigators. A space on the card enables the reporting official to give any additional information that he thinks is pertinent.

OF THE FIVE MAJOR SOURCES OF POLLUTION, INDUSTRIAL OPERATIONS WERE LEADING KILLER OF FISH IN 1970 . . .

. . . with municipal operations in second place. Figure 2 shows the relationship between the reported number of fish killed for the major pollutional sources. Note that the height of the bars is proportional to the reported number of fish killed.

Figure 2—REPORTED NUMBER OF FISH KILLED VERSUS MAJOR SOURCES OF POLLUTION



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

. . . sewerage systems, a municipal operation, was the leading killer of fish in 1970. 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 250 fish for "barge or boat" and 6,513,311 fish for "sewerage systems."

Figure 3
REPORTED NUMBER OF FISH KILLED VERSUS SOURCE OF POLLUTION

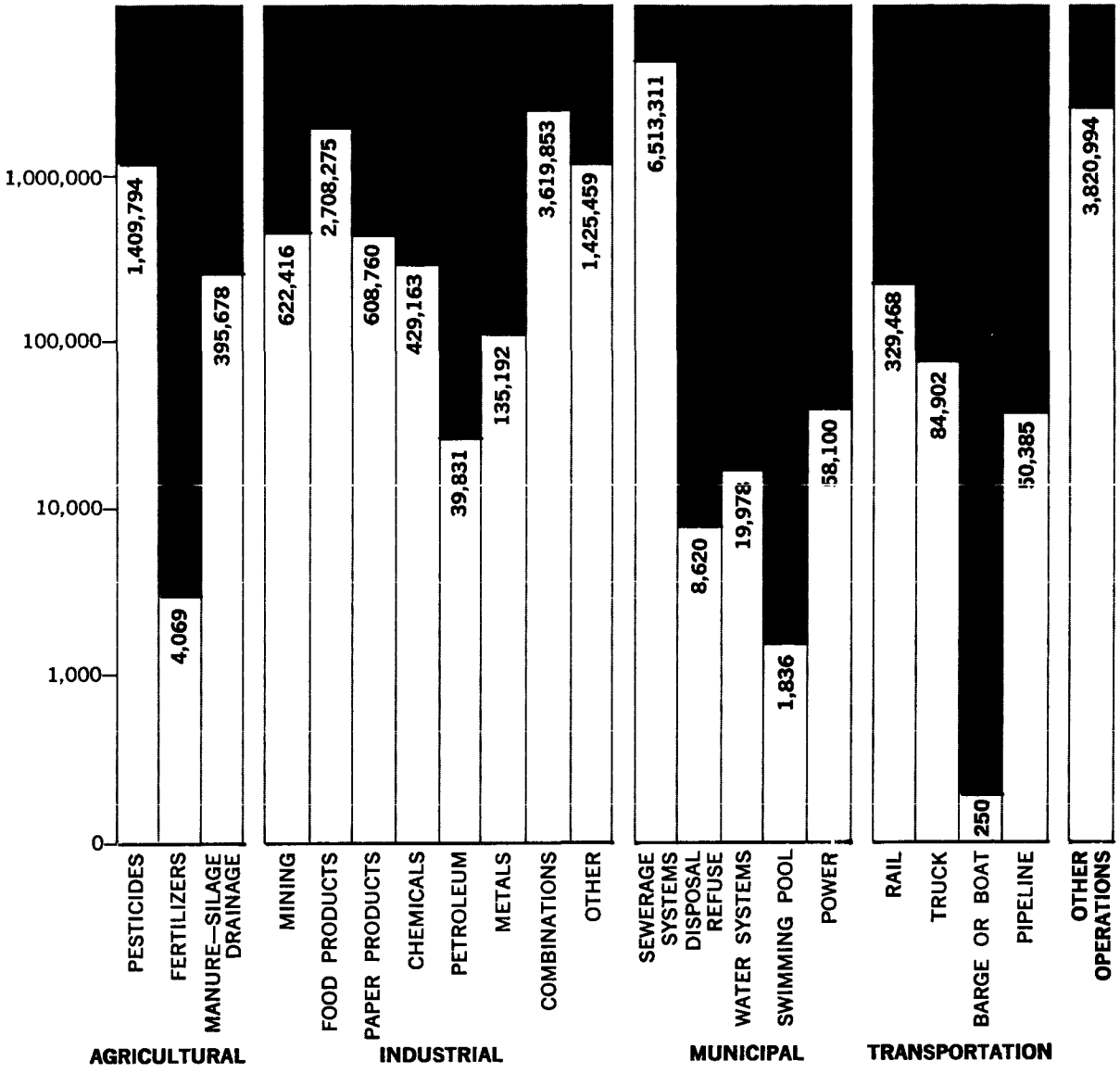


Table 3—Fish Kill Summary by Source of Pollution, 1970

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	63	58	1,409,794				
Fertilizers	6	6	4,069				
Manure-silage drainage	38	31	395,678				
Subtotal	**107**	**95**	**1,809,541**	**6,278**	**1,884,877**	**352,471**	**1,532,406**
INDUSTRIAL:							
Mining	23	19	622,416				
Food products	32	24	2,708,275				
Paper products	14	13	608,760				
Chemicals	61	53	429,163				
Petroleum	26	17	39,831				
Metals	13	13	135,192				
Combinations	13	12	3,619,853				
Other	31	26	1,425,459				
Subtotal	**213**	**177**	**9,588,949**	**6,404**	**9,819,493**	**3,250,252**	**6,569,241**
MUNICIPAL:							
Sewerage systems	92	83	6,513,311				
Refuse disposal	5	5	8,620				
Water systems	12	12	19,978				
Swimming pool	5	5	1,836				
Power	5	4	58,100				
Subtotal	**119**	**109**	**6,601,845**	**7,007**	**6,671,915**	**293,564**	**6,378,351**
TRANSPORTATION:							
Rail	8	6	329,468				
Truck	13	13	84,902				
Barge or boat	1	1	250				
Pipeline	6	6	50,385				
Subtotal	**28**	**26**	**465,005**	5,724	3,901,130	284,782	3,616,348
OTHER OPERATIONS	167	153	3,820,994	**9,200**	**483,405**	**177,409**	**305,996**
Total	**634**	**560**	**22,286,334**	**6,412**	**22,760,820**	**4,358,478**	**18,402,342**

* Derived after excluding 31 reports of 100,000 kills or more as being unrepresentative.
** Includes all fish killed plus an allowance computed for reports which do not indicate the number of fish that died.

Table 3 summarizes 1970 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 for each major source is also indicated.

Table 4—Pollution-Caused Fish Kill Summary by State, 1970

State	Total reports	Reports specifying number of fish killed		Extent of damage					
				River		Lake		Shore	
		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	18	18	4,867,677	10	97	1	50	7	8
Alaska	4	3	550,585	1	18	1	5	2	11,520
Arizona	2	2	132,299	2	8	—	—	—	—
Arkansas	11	7	117,000	7	68	4	393	—	—
California	42	42	3,260,311	31	48	10	139	1	—
Colorado	1	1	10,949	1	9	—	—	—	—
Connecticut	21	16	23,690	15	45	4	312	2	1
Delaware	1	1	800	—	—	1	4	—	—
Florida	14	6	156,290	3	—	11	72	—	—
Georgia	20	16	2,029,996	11	18	9	8,559	—	—
Hawaii	7	4	2,530	1	1	—	—	6	47
Idaho	9	9	310,056	8	38	1	15	—	—
Illinois	8	8	106,194	8	43	—	—	—	—
Indiana	20	20	73,832	19	60	1	8	—	—
Iowa	3	1	10,000	2	10	1	—	—	—
Kansas	17	16	255,900	14	65	3	21,961	—	—
Kentucky	23	13	170,890	22	79	1	—	—	—
Louisiana	11	9	6,000	10	28	1	12	—	—
Maine	6	3	7,000	6	13	—	—	—	—
Massachusetts	9	9	87,100	5	13	3	111	1	63
Michigan	10	5	26,100	8	3	2	—	—	—
Minnesota	9	7	8,800	7	18	2	10	—	—
Missouri	29	27	650,847	27	119	2	12	—	—
Montana	1	1	2,000	—	—	1	7	—	—
Nebraska	15	13	14,184	8	24	7	55	—	—
New Hampshire	8	6	4,166	3	3	5	333	—	—
New Jersey	29	28	55,400	19	25	8	9	2	2
New York	20	19	81,000	18	44	1	10	1	—
North Carolina	14	13	829,911	12	75	2	200	—	—
North Dakota	3	3	62,000	3	18	—	—	—	—
Oklahoma	12	12	232,589	10	59	2	4	—	—
Oregon	6	6	44,038	6	76	—	—	—	—
Pennsylvania	50	49	528,190	48	206	2	38	—	—
Rhode Island	1	1	50	—	—	1	5	—	—
South Carolina	10	10	45,614	7	69	3	230	—	—
South Dakota	1	1	7,000	—	—	1	45	—	—
Tennessee	34	33	596,335	30	104	4	210	—	—
Texas	56	47	6,236,050	41	112	5	3	10	27
Utah	1	1	300	1	1	—	—	—	—
Vermont	2	2	2,300	2	3	—	—	—	—
Virginia	22	22	66,523	17	102	4	6	1	12
Washington	24	21	189,823	19	43	2	2	3	7
West Virginia	11	11	41,402	10	28	1	6	—	—
Wisconsin	15	14	373,363	13	51	2	331	—	—
Wyoming	4	4	9,250	2	21	2	11	—	—
Total	**634**	**560**	**22,286,334**	**487**	**1,865**	**111**	**33,168**	**36**	**11,687**

Table 4 summarizes fish kills by 45 reporting States and indicates extent of damage for each of these states. Of the 634 reports, 560 indicated the number of fish killed. The remaining 74 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 the extent of damage resulting from pollution.

Table 5 summarizes fish kills by type of water body (river, lake, and shore); Table 6 summarizes fish kills by type of water (fresh, salt, and estuary); Table 7 summarizes fish kills by month; and Table 8 indicates severity of fish kills (complete kill, moderate kill, light kill, and not stated) by duration.

Table 5
Fish Kill Summary by Type of Water Body, 1970

Type of water body	Total reports	Reports specifying number of fish killed	
		Number of reports	Number of fish
River	487	438	13,099,598
Lake	111	94	3,119,708
Shore	36	28	6,067,028
Total	**634**	**560**	**22,286,334**

Table 6
Fish Kill Summary by Type of Water, 1970

Type of water	Total reports	Reports specifying number of fish killed	
		Number of reports	Number of fish
Fresh	577	512	11,991,099
Salt	7	3	536,000
Estuary	50	45	9,759,235
Total	**634**	**560**	**22,286,334**

Table 7
Fish Kill Summary by Month, 1970

Month	Total reports	Reports specifying number of fish killed	
		Number of reports	Number of fish
January	17	15	2,697,984
February	16	11	16,552
March	38	32	806,870
April	48	41	260,151
May	83	71	4,938,722
June	86	81	935,894
July	108	95	3,762,566
August	95	87	6,018,747
September	79	70	2,061,355
October	31	29	715,249
November	23	19	49,364
December	10	9	22,880
Total	**634**	**560**	**22,286,334**

Table 8
Severity of Fish Kills by Duration, 1970

Days	All reports *	Complete kill	Heavy kill	Moderate kill	Light kill	Not stated
Less than 1	74	10	23	16	21	4
1	140	21	52	36	29	2
2	98	21	45	18	11	3
3	28	5	12	9	2	—
4	15	3	7	4	—	1
5	14	3	8	3	—	—
6	4	—	3	1	—	—
7	8	3	2	1	1	1
8	4	—	3	1	—	—
9	1	—	1	—	—	—
10	2	—	—	1	1	—
11	1	—	1	—	—	—
12	2	—	1	1	—	—
13	1	—	1	—	—	—
14	4	—	2	1	1	—
15	2	1	—	1	—	—
20	1	—	1	—	—	—
21	1	—	1	—	—	—
25	2	—	1	—	1	—
30	2	1	1	—	—	—
50	1	—	—	1	—	—
73	1	1	—	—	—	—
90	1	—	—	—	1	—
98	1	1	—	—	—	—
Total	**408**	**70**	**165**	**94**	**68**	**11**
Average	**3.25**	**4.96**	**2.92**	**2.77**	**3.13**	**1.91**

* Includes only reports which indicated duration of kill

Table 9 summarizes severity of fish kills; Table 10 shows severity of fish kills by major source of pollution; and Table 11 indicates fish kill duration by major source of pollution.

Table 9—Fish Kill Summary by Severity of Kill, 1970

Severity of kill	Total reports	Reports specifying number of fish killed		Estimated numbers of fish killed *	Average kill **
		Number of reports	Number of fish		
Complete kill	100	88	2,398,603	2,480,305	6,808
Heavy kill	222	201	17,935,435	18,214,120	13,270
Moderate kill	127	116	1,209,999	1,256,252	4,204
Light kill	116	104	84,286	94,317	835
Not stated	69	51	658,011	715,826	3,211
Total	**634**	**560**	**22,286,334**	**22,760,820**	**6,412**

* Includes all fish killed as reported plus an allowance computed for reports which did not indicate the number of fish that died.

** Derived after excluding 31 reports of 100,000 kills or more as being unrepresentative.

Table 10—Severity of Fish Kills by Source of Pollution, 1970

Source of pollution	All reports	Complete kill	Heavy kill	Moderate kill	Light kill	Not stated
	Number					
Agricultural Operations	107	17	47	17	14	12
Industrial Operations	213	40	74	44	33	22
Municipal Operations	119	19	44	23	22	11
Transportation Operations	28	8	10	3	6	1
Other Operations	167	16	47	40	41	23
Total	**634**	**100**	**222**	**127**	**116**	**69**
	Percent					
Agricultural Operations	100.0	15.9	43.9	15.9	13.1	11.2
Industrial Operations	100.0	18.8	34.7	20.7	15.5	10.3
Municipal Operations	100.0	16.0	37.0	19.3	18.5	9.2
Transportation Operations	100.0	28.6	35.7	10.7	21.4	3.6
Other Operations	100.0	9.5	28.1	24.0	24.6	13.8
Total	**100.0**	**15.8**	**35.0**	**20.0**	**18.3**	**10.9**

Average of number of fish killed

All reports, 6,400; Complete kill, 6,800; Heavy kill, 13,300; Moderate kill, 4,200; Light kill, 800

Table 11
Pollution Source of Fish Kills by Duration, 1970

Days	All reports **	Agricultural operations	Industrial operations	Municipal operations	Transportation operations	Other operations
Less than 1*	74	9	20	20	3	22
1*	140	36	37	26	5	36
2	98	17	41	16	5	19
3	28	5	13	5	2	3
4	15	3	6	3	1	2
5	14	5	6	—	—	3
6	4	—	2	1	—	1
7	8	1	2	1	1	3
8	4	1	2	—	1	—
9	1	—	1	—	—	—
10	2	—	2	—	—	—
11	1	—	1	—	—	—
12	2	—	1	—	—	1
13	1	1	—	—	—	—
14	4	1	—	1	—	2
15	2	—	1	1	—	—
20	1	—	1	—	—	—
21	1	—	—	—	—	1
25	2	—	—	1	1	—
30	2	2	—	—	—	—
50	1	—	—	—	—	1
73	1	—	—	1	—	—
90	1	—	—	—	—	1
98	1	—	1	—	—	—
Total	**408**	**81**	**137**	**76**	**19**	**95**
Average	**3.25**	**2.81**	**3.28**	**3.09**	**3.47**	**3.63**

* The sum of the first two elements in each column gives the number of fish kills lasting one day or less.

** Includes only reports which indicated duration of kills.

Table 12 lists individual fish kills with identifiable 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 non-game), percent of commercial value, estimated fish killed, severity, extent of damage, and duration.

Table 13 lists individual fish kills without identifiable causes.

Report of Fish Kills, 1970—Cause Identifiable

Table 12

Body of water	City or town	Date	Cause [1] see code page 18	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 18	Estimated miles or acres affected	Duration: Days	Duration: Hrs.
ALABAMA											
Locust Fork	Birmingport	8 12 70	31	1%	99%	1%	11,796	3	30M	3	—
Cahaba River	Centreville	8 24 70	28	20%	80%	60%	65,000	2	30M	5	—
Warrior River	Demopolis	9 18 70	11	88%	12%	11%	3,924	3	5A	3	—
Lake Eufaula	Eufaula	5 06 70	11	100%	—	—	1,500	4	50A	1	—
Valley Cr-Marina	Gilmore	10 13 70	32	90%	10%	1%	4,500	3	3M	2	—
Shades Creek	Irondale	2 23 70	26	33%	67%	11%	1,452	4	8M	10	—
Locust Fork	Maxine	10 20 70	21	40%	60%	1%	8,387	1	1M	2	—
Industrial Canal	Mobile	9 25 70	22	—	100%	100%	114,148	2	2M	—	5
Ind CA 3 Mile Cr	Mobile	10 14 70	31	—	100%	100%	32,000	2	2M	1	—
Dog River	Mobile	5 27 70	31	—	—	100%	3,240,000	2	1M	—	6
Hog Bayou	Mobile	5 29 70	23	—	100%	100%	1,300	4	1M	1	—
Dog R-Eslava Cr	Mobile	9 16 70	31	—	100%	—	5,200	4	—	1	—
Dog River	Mobile	5 29 70	31	—	100%	100%	1,000	4	1M	—	6
Chickasaw Creek	Mobile	4 19 70	23	60%	40%	2%	420	3	1M	1	—
Wolf Creek	Parrish	3 20 70	21	60%	40%	24%	83,350	2	10M	11	—
Locust Fork	Powhatan	10 21 70	27	—	100%	—	481,200	2	5M	2	—
Cahaba River	Trussville	9 01 70	26	60%	40%	2%	12,500	1	3M	5	—
ALASKA											
Lake Sansing	Clear A F S	3 06 70	35	100%	—	—	50,500	1	5A	7	—
Chilkat River	Haines	9 28 70	44	50%	50%	50%	85	4	18M	2	—
Chiniak Bay	Kodiak	4 01 70	25	20%	80%	20%	—	3	5,120A	8	—
Silver Bay	Sitka	9 11 70	23	25%	75%	75%	500,000	3	6,400A	—	6
ARIZONA											
Verde River	Camp Verde	6 02 70	11	6%	94%	—	129,199	1	6M	2	—
Canal System	Somerton	10 04 70	28	100%	—	—	3,100	2	2M	—	—
ARKANSAS											
Ditch Ne Armorel	Armorel	10 23 70	11	25%	75%	—	—	2	1M	1	—
Burnt Bayou	Biscoe	11 05 70	11	10%	90%	21%	2,000	2	2M	2	—
Two Bayou Creek	Camden	5 31 70	41	75%	25%	25%	—	1	8M	3	—
Des Arc Bayou	Des Arc	6 23 70	11	25%	75%	30%	3,000	3	5A	1	—
Lake Catherine	Hot Springs	4 23 70	21	25%	75%	—	2,000	2	5A	9	—
Canal 43 Macon L	Lake Village	5 10 70	11	33%	67%	40%	80,000	2	45M	5	—
Bayou Two	Lonoke	8 10 70	42	37%	63%	51%	2,000	3	2M	—	—
Dardanelle Lake	Russellville	2 20 70	25	95%	5%	—	—	1	10A	3	—
Lake Enterprise	Wilmot	3 12 70	11	—	100%	—	18,000	2	360A	5	—
CALIFORNIA											
Auburn Ravine Cr	Auburn	5 18 70	31	25%	75%	—	12	4	1M	—	24
Austin Cr	Cazadero	7 07 70	24	20%	80%	—	3,500	—	—	—	—
Pond Sec 12 Tios	Fallbrook	3 05 70	11	—	100%	—	500	3	1A	1	—
Holts Drain	Imperial County	5 18 70	11	100%	—	—	4,000	—	—	—	—
100 Yds W Hwy 43	Kings County	9 06 70	11	70%	30%	—	4,000	—	—	—	—
Bet 13 & 14-Hood	Kings County	7 15 70	11	—	100%	—	2,500	—	—	—	—
Lafayette Reser	Lafayette	4 20 70	33	100%	—	—	200	1	133A	—	—
Lagunitas Creek	Lagunitas	5 12 70	33	100%	—	—	3,000	1	3M	—	—
Delta Mendota Ca	Los Banos	1 18 70	22	100%	—	—	2,500,000	2	10M	—	—
Bon Tempe Reserv	Marin County	11 13 70	24	2%	98%	—	4,000	—	—	—	—
Drainage Ditch	Mecca	1 12 70	12	3%	97%	—	410	—	1M	—	—
San Joaquin Riv	Merced County	11 22 70	13	20%	80%	—	5,000	—	—	—	—
Linda Creek	Roseville	5 29 70	33	5%	95%	—	1,300	—	—	—	24
Hdwtr Badger Cr	Sacramento Co	7 29 70	12	50%	50%	—	1,000	—	—	—	—
Tonminging Stain		9 18 70	24	15%	85%	—	5,400	—	—	—	—
Santa Rosa Lag	Sebastopol	7 29 70	22	99%	1%	—	5,000	1	1M	7	—
Dominic & Rowdy	Smith River	5 01 70	24	5%	95%	—	100,000	1	3M	1	—
Soquel Creek	Soquel	8 21 70	28	45%	55%	—	23,000	1	2M	—	9
Tuolumne River	Stanislaus Co	3 31 70	28	—	—	—	500,000	—	—	—	—
Port of Stockton	Stockton	1 22 70	43	—	100%	—	250	—	—	1	—
Irrg Dth-Susan R	Susanville	6 20 70	11	100%	—	—	200	2	2M	1	—
Sugar Cr	Tracy	8 30 70	31	40%	60%	—	17,000	—	—	—	—
Mill Cr	Tulare County	3 31 70	33	50%	50%	—	3,100	—	—	—	—
Trib Russian R	Ukiah	2 24 70	32	100%	—	—	270	—	1M	—	—
Mid Fk Mokelumne	West Point	6 24 70	28	100%	—	—	3,500	2	—	—	—
Walker Creek	Willows	3 23 70	22	25%	75%	—	1,000	1	4M	4	—
Yreka Creek	Yreka	5 16 70	50	100%	—	—	800	1	1M	1	—
COLORADO											
Mt Shavano Hatch	Nathrop	9 22 70	41	100%	—	—	10,949	4	9M	2	—
CONNECTICUT											
Barber Pond	Bloomfield	4 13 70	24	100%	—	—	400	1	16A	—	—
Copper Mine Brk	Bristol	9 11 70	33	100%	—	—	100	2	—	—	—
Broad Brook Res	Cheshire	6 28 70	24	20%	80%	—	2,050	2	225A	—	—

Nelkins Brook	Colchester	11 09 70	21	100%	—	—	100	2	1M	—	—
Thames River	Groton	7 30 70	24	100%	—	—	200	—	—	—	—
Mattabassett R	Kensington	11 26 70	28	10%	90%	—	500	3	3M	—	—
Brewsters Pond	Lebanon	8 13 70	28	50%	50%	—	—	2	70A	—	—
Hoxie Brook	Lebanon	6 07 70	13	100%	—	—	—	1	—	—	—
Long Meadow PD B	Naugatuck	6 12 70	24	—	100%	—	2,000	1	10M	—	—
Thames River	New London	9 27 70	24	70%	30%	—	—	—	1M	—	—
Shetucket River	Norwich	7 08 70	24	50%	50%	—	3,000	2	5M	—	—
White Brook	Pomfret	4 18 70	13	100%	—	—	100	—	2M	—	—
Quinnipiac River	Southington	7 04 70	24	—	100%	—	—	3	2M	—	—
Tankerhoosen R	Talcottville	8 04 70	11	—	100%	—	90	4	1M	—	—
Naugatuck R-E Br	Torrington	5 28 70	24	10%	90%	—	400	2	2M	—	—
Stanley Pond	Washington	10 13 70	11	100%	—	—	1,000	1	1A	—	—
Shetucket River	Willimantic	9 22 70	24	—	100%	—	350	—	3M	—	—
Shetucket River	Willimantic	8 20 70	24	2%	98%	—	—	—	4M	—	—
Shetucket River	Willimantic	7 28 70	24	2%	98%	—	3,100	2	5M	—	—
Windsor Locks Ca	Windsor Locks	8 02 70	28	100%	—	—	10,000	2	5M	—	—
DELAWARE											
Banning Park La	Newport	4 08 70	31	95%	5%	—	800	—	4A	—	—
FLORIDA											
Lake Lotela	Avon Park	7 21 70	50	—	100%	—	—	3	—	1	—
Crooked Lake	Babson Park	12 18 70	11	99%	1%	—	271	4	1A	2	—
Boiler Lake	Dade City	2 12 70	28	100%	—	—	—	3	15A	—	—
Horse Creek	Davenport	4 24 70	22	80%	20%	—	—	2	—	—	5
Ortega Creek	Jacksonville	3 25 70	28	100%	—	—	300	—	—	—	—
Griffin Pd-Priv	Lakeland	9 16 70	13	100%	—	—	120,300	2	5A	2	—
Lake Brooker	Lutz	10 20 70	13	1%	99%	—	34,585	3	26A	2	—
Thonotosassa La	Thonotosassa	4 03 70	22	63%	37%	—	—	4	—	—	—
Shipp Lake	Winter Haven	3 31 70	22	—	—	—	—	4	—	—	—
Roy Lake	Winter Haven	3 31 70	22	—	—	—	—	4	—	—	—
Howard Lake	Winter Haven	3 31 70	22	—	—	—	—	4	—	—	—
GEORGIA											
Morrison Creek	Adel	5 23 70	24	—	—	—	4,340	2	2M	1	—
Bear Creek	Adel	10 10 70	31	40%	60%	—	1,250	—	6M	—	—
Camille Cr-Lakes	Augusta	7 23 70	31	—	—	—	2,000,000	2	15A	1	—
Pd In Gordon Co	Calhoun	1 27 70	42	100%	—	—	750	2	1A	—	—
South River	Comer	2 12 70	24	2%	98%	—	—	2	—	—	—
Broadtown Creek	Ellijay	5 05 70	13	—	—	—	—	—	—	—	—
Lake Lanier	Gainesville	4 13 70	31	1%	99%	1%	1,137	2	20A	1	—
Lake Lanier	Gainesville	9 16 70	31	—	100%	—	300	1	1A	—	—
James Mc Jeskie	Hartwell	5 13 70	13	100%	—	—	—	3	2A	1	—
Mill Creek	Hinesville	5 13 70	28	90%	10%	—	200	2	—	2	—
Chattahoochee R	Lagrange	1 16 70	25	—	100%	—	2	4	—	—	—
Pond-Lindy Davis	Lawrenceville	5 22 70	11	100%	—	—	2,150	1	1A	—	—
Okapiled Creek	Moultrie	5 21 70	28	50%	50%	—	7,100	2	—	3	—
Brushy Creek	Ocilla	4 29 70	13	45%	55%	—	700	2	1M	—	6
La of JH Herndon	Pavo	3 25 70	12	100%	—	—	45	4	3A	3	—
Pond Next to RR	Upton	9 10 70	41	50%	50%	—	—	1	1A	7	—
Oconee River	Watkinsville	5 01 70	32	40%	60%	—	1,500	2	6M	2	—
Kettle Creek	Waycross	5 21 70	22	60%	40%	—	22	1	3M	—	—
HAWAII											
Wailupe Canal	Honolulu	7 13 70	50	33%	67%	25%	—	2	1M	2	—
IDAHO											
Bricker Springs	Arco	7 17 70	11	100%	—	—	600	1	1A	1	—
St Joe River	Avery	9 11 70	41	40%	60%	—	235,000	1	15M	2	—
Goose Creek	Burley	6 03 70	11	14%	86%	—	4,100	1	1M	1	—
Heyburn Drain Ca	Heyburn	8 05 70	11	1%	99%	—	2,000	2	6M	—	—
Trail Creek	Ketchum	8 10 70	34	100%	—	—	300	2	1M	1	—
Portneuf River	Lava Hot Springs	7 20 70	11	2%	98%	—	40,000	2	7M	2	—
Halvorsen Lake	Melba	6 10 70	11	110%	—	—	20,000	2	15A	2	—
Drain Ditch-B-16	Rupert	6 04 70	11	—	100%	—	5,000	1	2M	—	—
Pine Creek	Swan Valley	9 05 70	42	32%	68%	—	3,056	1	5M	—	2
ILLINOIS											
Indian Creek	Abingdon	11 19 70	24	10%	90%	3%	4,421	1	4M	2	—
Salt Creek	Bellflower	8 22 70	13	6%	94%	18%	34,340	2	8M	2	—
Crab Orchard Cr	Carbondale	7 02 70	50	46%	54%	30%	1,852	2	6M	3	—
Little Muddy R	Desota	6 04 70	21	99%	1%	—	27,493	3	11M	4	—
Drummer Creek	Gibson City	8 27 70	22	1%	99%	4%	7,773	3	3M	2	—
Trib to So Fork	Taylorville	8 02 70	22	55%	45%	80%	718	3	4M	3	—
INDIANA											
Muscatutuck River	Austin	9 08 70	31	—	—	—	10,000	2	—	—	—
Moots Creek	Brookston	9 04 70	13	40%	60%	—	5,000	3	5M	—	—
Haw Creek	Columbus	7 10 70	31	50%	50%	—	1,000	3	2M	—	—
Blue River	Edinburg	8 25 70	31	25%	75%	—	850	3	2M	—	—
Maumee River	Fort Wayne	8 21 70	31	—	100%	—	11,000	1	5M	—	—
W Fork White River	Gosport	8 24 70	31	60%	40%	—	4,123	3	11M	—	—
Mud Creek	Henderson	7 29 70	13	33%	67%	—	2,248	3	—	—	—
Mud Cr (Rush Co)	Henderson	7 29 70	28	—	100%	—	2,248	1	2M	2	—
Wildcat Creek	Kokomo	8 11 70	31	—	100%	—	10,000	2	2M	—	—
Silver Creek	Liberty	9 05 70	22	5%	95%	—	1,569	3	2M	—	—
White River	Noblesville	8 19 70	31	—	100%	—	1,000	3	8M	2	—
Salamonie River	Portland	9 13 70	31	15%	85%	—	1,100	3	9M	—	—
Billy (WMS) Cr	Rockville	10 05 70	31	—	—	—	7,500	2	—	—	—
Rock Run	Rockville	9 09 70	11	—	—	—	250	4	—	—	—
Buck Creek	Tipton	9 08 70	22	4%	96%	—	2,500	3	5M	—	—
IOWA											
White Water Creek	Epworth	5 13 70	27	—	100%	—	10,000	3	10M	—	—
Muscatine Slough	Grandview	5 12 70	11	1%	99%	—	—	2	—	1	—
Clear Creek	Mechanicsville	5 12 70	13	5%	95%	—	—	1	—	1	—

Report of Fish Kills, 1970—Cause Identifiable

Table 12

CONTINUED

Body of water	City or town	Date	Cause [1] see code page 18	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 18	Estimated miles or acres affected	Duration: Days	Duration: Hrs.
KANSAS											
Trib-Four-Mi Creek	Andover	11 25 70	31	100%	—	100%	200	3	1M	1	—
Trib-Walnut River	Arkansas City	5 26 70	13	60%	40%	40%	2,000	2	3M	2	—
Cottonwood River	Cottonwood Falls	6 19 70	13	30%	70%	20%	—	4	1M	—	6
Walnut Creek	El Dorado	9 18 70	25	50%	50%	65%	2,000	2	2M	2	—
Cross Creek	Emporia	4 17 70	13	15%	85%	35%	2,000	2	2M	2	—
Wet Walnut Creek	Great Bend	8 29 70	13	7%	93%	40%	1,500	3	1M	1	—
Morgan Pond	Holton	9 23 70	13	100%	—	100%	1,200	1	1A	2	—
Arkansas River	Larned	10 10 70	31	20%	80%	25%	40,000	2	15M	—	—
Tr-Big Slough Creek	Oskaloosa	6 21 70	13	95%	5%	75%	8,000	2	2M	1	—
Labette Creek	Parsons	9 02 70	13	30%	70%	30%	100,000	2	15M	4	—
Saline River	Tescott	7 18 70	22	10%	90%	10%	650	3	2M	1	—
Marais Descygnes	Trading Post	2 10 70	25	99%	1%	5%	4,000	3	12M	10	—
KENTUCKY											
Brush Creek	Adair County	6 23 70	25	—	—	—	—	—	3M	—	—
Private Pond	Allen County	11 03 70	25	—	—	—	—	—	—	—	—
Staples Branch	Barren County	10 06 70	27	—	—	—	—	—	1M	—	—
Looney C-Poor Fork	Benham	8 25 70	21	3%	97%	37%	—	2	—	—	—
Clear Creek	Bullitt County	3 20 70	21	—	—	—	—	—	—	—	—
Handcock Creek	Clark County	5 20 70	28	—	—	—	—	—	2M	—	—
Poor Fork Cumbrlnd	Harlan County	8 20 70	28	—	—	—	4,642	—	4M	—	—
Beaver Creek P	Ike County	7 31 70	21	—	—	—	—	—	3M	—	—
Little Laurel River	Laurel County	6 09 70	22	—	—	—	3,000	—	6M	—	—
Limestone Creek	Mason County	3 25 70	24	—	—	—	2,000	—	—	—	—
Br of Island Creek	McCracken Co	9 22 70	25	—	—	—	—	—	—	—	—
Mill Creek	Monroe County	9 01 70	31	—	—	—	—	1	2M	—	—
Russell Fork	Pike County	2 06 70	24	—	—	—	1,404	—	20M	—	—
Drakes Creek	Simpson County	5 25 70	31	—	—	—	—	—	—	—	—
LOUISIANA											
Davis Bayou	Cotton Valley	1 06 70	24	50%	50%	—	300	3	1M	—	12
St James Canal	Donaldsonville	3 19 70	24	10%	90%	—	—	1	5M	2	—
Gl Waterway	La Rose	5 02 70	23	—	100%	10%	3,000	3	15M	5	—
Sabine River	Logansport	3 — 70	31	50%	50%	—	475	2	1M	2	—
La Des Allemands	Luling	1 13 70	24	40%	60%	50%	—	1	12M	2	—
Trib Colewa Bayou	Oak Grove	9 22 70	22	50%	50%	—	100	4	1M	2	—
Twelve-Mi Bayou	Shreveport	8 25 70	31	—	100%	—	125	4	1M	1	—
Lonewa Bayou	Sterlington	6 23 70	24	50%	50%	—	225	3	1M	2	—
Quachita River	Sterlington	7 08 70	24	25%	75%	—	550	2	1M	2	—
Lonewa Bayou	Sterlington	4 30 70	24	50%	50%	—	225	3	1M	1	—
Toney Bayou	West Monroe	4 24 70	23	1%	99%	—	1,000	1	1M	1	—
MAINE											
Taylor Brook	Auburn	8 17 70	31	—	100%	—	—	4	1M	—	—
Prestile Stream	Easton	8 26 70	22	25%	75%	—	—	1	7M	2	—
Cousins River	Freeport	3 21 70	42	—	—	—	3,000	4	1M	25	—
Hunter Brook	New Limerick	7 30 70	11	10%	90%	—	3,000	1	2M	1	—
Mill Brook	New Limerick	7 30 70	11	90%	10%	—	—	2	1M	1	—
Salmon Stream	Washburn	6 21 70	24	34%	66%	—	1,000	1	1M	—	12
MASSACHUSETTS											
Millers River	Athol	7 07 70	23	40%	60%	—	5,000	2	5M	2	—
Muddy Cove Brook	Dighton	12 04 70	24	50%	50%	—	500	3	2A	1	—
Acushnet River	Fairhaven	6 22 70	50	—	100%	100%	30,000	2	3M	6	—
Cedar Swamp Pond	Milford	5 10 70	11	4%	96%	—	2,500	2	65A	18	—
Broad Cove	Onset	8 23 70	11	2%	98%	5%	41,000	2	63A	1	—
Studley Pond	Rockland	8 14 70	11	5%	95%	—	4,000	2	26A	4	—
Jordan Pond	Shrewsbury	5 05 70	50	2%	98%	—	2,000	2	20A	14	—
Mill River	Taunton	4 29 70	26	—	100%	—	100	3	2M	3	—
Connecticut River	W Springfield	12 19 70	35	—	100%	—	2,000	3	1M	—	4
MICHIGAN											
St Joseph River	Hillsdale	9 24 70	31	—	—	—	100	4	—	—	—
Grand River	Lansing	8 20 70	31	—	—	—	—	—	—	—	—
Apel Drain	Macomb County	5 15 70	11	—	100%	—	—	4	—	—	—
Killenbeck Drain	Mt Pleasant	7 24 70	28	—	—	—	—	4	—	—	—
Anna River	Munising	5 15 70	31	95%	5%	—	—	2	—	—	—
Paw Paw River	Paw Paw	9 17 70	42	10%	90%	—	16,300	2	—	—	—
Brower Drain	Zeeland	4 15 70	24	5%	95%	—	—	1	3M	—	—
MINNESOTA											
Zumbro River	Claremont	7 11 70	22	—	100%	—	—	2	2M	—	—
St Louis River	Cloquet	7 29 70	23	1%	99%	—	1,000	2	2M	—	—
Hall Lake	Fairmont	8 11 70	11	75%	25%	—	200	4	2M	—	2
Pelican River	Pelican Rapids	9 21 70	22	—	—	—	300	4	1M	—	—
Roseau River	Roseau	8 20 70	11	90%	10%	—	5,000	2	4M	5	—
Six Mile Creek	St Bonafacious	8 04 70	31	00%	—	—	200	3	1M	—	—
Six Mile Creek	St Bonafacious	4 24 70	31	10%	90%	—	100	4	1M	—	—

MISSOURI											
Monegaw Creek	Appleton City	9 10 70	21	10%	90%	—	25	4	1M	1	—
Blackberry Creek	Asbury	5 24 70	21	96%	4%	—	85,000	2	3M	2	—
Cedar Creek	Ashland	8 07 70	21	50%	50%	—	62,000	2	28M	6	—
Big Piney River	Cabool	12 28 70	25	20%	80%	—	25	4	1M	—	—
Tebo Creek	Calhoun	9 02 70	21	10%	90%	—	45,000	2	32M	20	—
Belews Creek	Cedar Hill	5 04 70	13	25%	75%	—	—	2	4M	1	—
Rocky Fork Creek	Columbia	8 22 70	21	8%	92%	—	17,000	2	5M	3	—
La Gree Pond	Conway	9 26 70	13	100%	—	—	135	2	1A	1	—
No Creek	Farmersville	8 03 70	13	25%	75%	—	1,300	2	2M	—	—
Basin Fork	Green Ridge	9 17 70	13	—	—	—	47	—	1M	2	—
Joachim Creek	Herculaneum	9 14 70	26	2%	98%	—	50	4	1M	2	—
Ranch Roy-L 3 La	High Hill	5 29 70	11	20%	80%	—	500	3	10A	1	—
Silver Creek	Joplin	2 27 70	24	25%	75%	—	1,000	2	1M	—	—
Steer Creek	Kirksville	5 03 70	31	50%	50%	—	1,500	2	10M	1	—
Goodwin Hollow	Lebanon	4 22 70	31	—	100%	—	100	—	1M	2	—
Goodwin Hollow C	Lebanon	10 13 70	31	10%	90%	—	800	1	1M	1	—
Noix Creek Slough	Louisiana	11 — 70	42	20%	80%	—	580	1	2A	—	—
Grand Glaize Creek	Manchester	7 09 70	31	5%	95%	—	—	2	1M	1	—
Mill Creek	Mineral Point	8 28 70	13	25%	75%	—	200	2	2M	1	—
Private Farm Pond	Savannah	6 16 70	11	100%	—	—	1,500	2	4A	3	—
River Des Peres	St Louis	10 02 70	31	1%	99%	—	50,000	1	2M	—	—
Sac River	Stockton	7 25 70	50	15%	85%	—	20,000	2	3M	—	—
Crooked Creek	Troy	5 05 70	50	10%	90%	—	349,000	1	7M	5	—
Spring River	Verona	8 05 70	24	35%	65%	—	8,000	2	1M	2	—
Little Sandy Creek	Whiteside	5 22 70	13	67%	33%	—	50	1	2M	1	—
MONTANA											
Conley Pond	Hardin	4 — 70	11	100%	—	—	2,000	1	7A	30	—
NEBRASKA											
Lost Creek	Columbus	6 13 70	11	25%	75%	—	415	2	1M	1	—
Weber Pond	Minatare	4 29 70	13	100%	—	—	400	2	2A	—	—
Sand Creek	Norman	6 07 70	28	5%	95%	—	500	2	10M	3	—
Willard Miers Pd	Seward	7 18 70	11	100%	—	—	125	2	—	1	—
Lodgepole Creek	Sidney	6 11 70	13	100%	—	—	15	2	1A	—	—
Djerrum Pond	Utica	5 05 70	42	100%	—	—	150	4	2A	—	—
Ainsworth Canal	Valentine	8 05 70	50	—	100%	—	10,000	2	4M	—	1
NEW HAMPSHIRE											
Beaver Brook	Derry	7 17 70	31	—	100%	—	225	3	—	—	—
Cohas Brook	Manchester	6 08 70	33	—	100%	—	300	3	—	—	—
Pecker Pond	Rindge	7 14 70	11	—	—	—	—	—	38A	—	—
Ashuelot River	Winchester	7 20 70	28	35%	65%	—	3,000	2	3M	—	—
NEW JERSEY											
Harrison Brook	Basking Ridge	9 23 70	50	—	—	—	200	3	1M	—	8
Trib Whippany River	Brookside	7 23 70	34	70%	30%	—	50	2	1M	1	—
Drakes Brook	Chester	4 27 70	31	—	100%	—	10	4	1M	1	—
Everittstown Brook	Everittstown	2 22 70	50	—	100%	—	30	4	1M	2	—
Popandusin Creek	Hazen	6 07 70	11	90%	10%	—	150	1	1M	1	—
Rockaway River	Parsippany	3 03 70	31	—	100%	—	4,000	1	3M	—	—
Otto Bofingers	Pemberton Twp	6 13 70	11	100%	—	—	10	4	1A	2	—
Delaware River	Phillipsburg	10 13 70	24	—	100%	—	50	4	1M	—	—
Delaware River	Phillipsburg	8 21 70	24	—	100%	—	50	4	1M	—	—
Ambrose Brook	Piscataway	10 07 70	24	—	100%	—	75	4	1M	—	—
Neshanic River	Ringoes	5 15 70	22	—	100%	—	75	1	1M	2	—
Fenwick Creek-Trib	Salem	3 11 70	28	—	100%	—	200	3	1M	1	—
Rahway River	Springfield	5 02 70	26	—	100%	—	3,000	3	2M	2	—
Rahway River	Union	6 06 70	26	—	100%	—	1,000	2	2M	1	—
Swedesboro Lake	W Gloucester Co	6 16 70	11	20%	80%	—	15,000	3	—	5	—
Musconetcong River	Warren Glen	9 03 70	23	10%	90%	—	5,000	2	2M	1	—
Corys Brook	Warren Twp	5 20 70	28	5%	95%	—	2,000	2	2M	—	—
NEW YORK											
Stony Creek	Adams Center	6 05 70	22	10%	90%	—	10,000	1	6M	2	—
Mianus River	Bedford	7 06 70	34	50%	50%	—	100	4	1M	—	4
Brush Brook	Bovina	6 17 70	42	20%	80%	—	100	3	1M	—	—
Mud Creek	Brant	7 07 70	11	3%	97%	—	10,000	2	2M	1	—
Salmon Creek	Brockport	8 06 70	31	—	100%	—	2,000	2	10M	2	—
Hudson River	Buchanan	3 11 70	35	99%	1%	—	—	2	—	—	—
Canadaway Creek	Fredonia	8 27 70	31	—	100%	—	5,000	2	1M	2	—
Van Campen Creek	Friendship	8 20 70	22	—	100%	—	3,000	4	2M	1	—
West Creek	Hamlin	10 25 70	22	10%	90%	—	200	2	10M	2	—
Brooks Dam Pond	N Y (Staten Is)	4 10 70	50	—	100%	—	150	2	10A	1	—
Deer River	North Lawrence	8 10 70	22	—	100%	—	2,000	4	2M	1	—
Sawyer Creek	North Tonawanda	11 02 70	26	—	100%	—	300	3	1M	2	—
Shekomeko Creek	Pine Plains	9 24 70	13	4%	96%	—	5,000	2	2M	2	—
Salmon Creek	Pultneyville	6 01 70	22	10%	90%	—	250	1	1M	2	—
Shingle Kill	Roundtop	6 21 70	50	35%	65%	—	400	2	1M	—	—
Oatka Creek	Warsaw	7 14 70	24	—	100%	—	5,000	2	1M	1	—
W Br 12-Mile Creek	Wilson	7 14 70	11	—	100%	—	2,000	2	1M	1	—
NORTH CAROLINA											
French Broad River	Brevard	5 13 70	23	1%	99%	—	1,500	3	6M	1	—
Chicod Creek	Grimesland	6 29 70	13	26%	74%	65%	500	4	1M	—	12
Abbotts Creek	Kernersville	12 02 70	31	30%	70%	17%	1,000	2	10M	6	—
Lake Junaluska	Lake Junaluska	11 21 70	11	—	100%	—	15,000	2	200A	13	—
N French Broad River	Rosman	8 25 70	50	35%	65%	—	661	3	1M	—	2
N Fk Rocky River	Siler City	6 02 70	11	80%	20%	—	500	4	1M	—	12
Drainage Canals	Swan Quarter	8 27 70	11	1%	99%	99%	750,000	2	9M	5	—
Yadkin River	Winston-Salem	6 08 70	31	5%	95%	55%	50,000	2	39M	25	—
NORTH DAKOTA											
Heart River	Dickinson	1 02 70	22	76%	24%	—	25,000	1	8M	98	—
Heart River	Dickinson	9 08 70	22	75%	—	25%	25,000	1	7M	—	—

Report of Fish Kills, 1970—Cause Identifiable

Table 12
CONTINUED

Body of water	City or town	Date	Cause [1] see code page 18	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 18	Estimated miles or acres affected	Duration: Days	Duration: Hrs.
OKLAHOMA											
South Canadian R	Bearden	1 30 70	31	1%	39%	60%	8,865	1	15M	4	—
Cimmaron River	Coyle	3 20 70	11	30%	70%	—	10,000	2	3M	1	—
Cimmaron River	Crescent	8 06 70	28	10%	90%	—	8,583	2	2M	8	—
Cimmaron River	Cushing	7 16 70	27	25%	75%	—	171,000	2	22M	3	—
Unnamed Stream	Miami	7 01 70	27	5%	95%	—	500	1	2M	1	—
Trib-N Canadian	Oklahoma City	7 22 70	31	1%	99%	—	4,000	2	2M	2	—
Pryor Creek	Pryor	12 02 70	44	40%	60%	—	17,500	1	8M	3	—
Flood Control La	Tupelo	9 01 70	11	80%	20%	—	200	3	3A	3	—
No Canadian River	Watonga	10 12 70	31	8%	92%	—	8,682	2	3M	2	—
Farm Pond	Waukomis	6 25 70	25	20%	80%	—	1,500	1	1A	2	—
Trib-Lagoon Creek	Yale	11 29 70	25	2%	98%	—	259	2	1M	2	—
OREGON											
FK Willamette River	Cottage grove	7 27 70	28	100%	—	—	13	2	1M	—	1
FK Willamette River	Cottage grove	7 27 70	28	—	—	—	10	2	1M	—	1
Row River	Culp creek	7 13 70	24	—	100%	—	15	3	3M	4	—
Snake river	Lt Goose dam	5 16 70	50	—	—	7%	43,400	2	69M	—	—
Spoon creek	Shedd	11 09 70	13	—	100%	—	200	1	1M	2	—
Sprngfld Mirace	Springfield	4 05 70	31	12%	88%	—	400	4	1M	—	6
PENNSYLVANIA											
Shobers Run	Bedford	6 03 70	50	6%	94%	—	10,983	1	3M	—	8
Hickory Creek	Bessemer	8 10 70	50	10%	90%	—	6,037	2	—	—	4
Monocacy Creek	Bethlehem	7 15 70	28	84%	16%	—	200	2	2M	—	3
Shirks Run	Blue Ball	4 30 70	25	20%	80%	—	2,166	1	2M	—	5
Bear Creek	Bruin	6 16 70	50	1%	99%	—	7,216	2	4M	2	—
N Br Susquehanna	Danville	9 15 70	28	10%	90%	—	1,575	4	1M	—	2
N Fork Pine Creek	Dayton	11 23 70	25	10%	90%	—	780	2	7M	2	—
Park Run	Downingtown	11 10 70	22	25%	75%	—	—	2	1M	—	24
Park Run	Downingtown	5 09 70	11	100%	—	—	206	3	1M	—	24
Sandy Lick Creek	Dubois	7 09 70	11	70%	30%	—	4,500	1	5M	1	—
Frankstown Br	East Freedom	5 04 70	25	100%	—	—	30	4	1M	—	—
Wiconisco Creek	Elizabethville	9 26 70	22	100%	—	—	300	3	3M	3	—
Cowley Run	Emporium	6 16 70	34	30%	70%	—	1,186	1	1M	—	3
Allegheny River	Entire Wtershed	6 17 70	21	10%	90%	—	35,000	2	—	4	—
E Condcocheague	Fayetteville	6 13 70	33	10%	90%	—	8,740	1	4M	—	—
Squaw Run	Fox Chapel	6 08 70	31	—	100%	—	200	4	1M	1	—
Minister Creek	Gilbertsville	7 29 70	32	100%	—	—	100	2	2M	1	—
Kreutz Creek	Hellam	6 09 70	31	10%	90%	—	227	2	4M	4	—
Perkiomen Creek	Hereford	8 15 70	22	25%	75%	—	2,670	2	1M	3	—
Cross Creek	Hickory	9 17 70	13	5%	95%	—	1,600	2	2M	4	—
Dyberry Creek	Honesdale	9 21 70	50	10%	90%	—	60,000	2	3M	—	20
Muddy Run	Intercourse	7 13 70	13	68%	32%	—	826	2	3M	1	—
W Br Susquehanna	Jersey Shore	8 26 70	21	10%	90%	—	238,850	2	17M	2	—
Mahoning Creek	Lehighton	9 18 70	33	25%	75%	—	392	3	1M	—	24
Plum Run	Lenape	4 30 70	50	100%	—	—	107	3	1M	—	24
W Br Susquehanna	MaHaffey	6 16 70	21	54%	46%	—	11,737	3	45M	15	—
Birch Run	Martins Corner	6 07 70	24	10%	90%	—	2,677	1	2M	1	—
Big Fishing Cr	Mill Hall	11 03 70	26	25%	75%	—	500	2	1M	—	10
Laurel Run	Milroy	10 01 70	33	30%	70%	—	140	3	1M	1	—
Trib Beaver Run	Oklahoma	3 22 70	50	100%	—	—	1,000	1	1A	5	—
Elk Creek	Ridgway	9 19 70	26	40%	60%	—	3,380	2	3M	1	—
Falls Creek	Rouzerville	7 01 70	33	15%	85%	—	1,406	1	2M	1	—
Private Pond	Roxbury	4 16 70	21	100%	—	—	2,500	1	10A	—	—
Coxes Creek	Somerset	8 31 70	11	100%	—	—	4,389	4	1M	2	—
Little Juniata R	Spruce Creek	4 28 70	41	60%	40%	—	51,483	2	12M	1	—
Spring Creek	State College	9 12 70	31	100%	—	—	1,100	3	2M	—	24
Spring Creek	Steelton	8 17 70	31	5%	95%	—	5,300	2	2M	1	—
McMichaels Creek	Stroudsburg	8 14 70	11	20%	80%	—	42,100	2	4M	1	—
Allegheny River	*Tarentum*	5 27 70	21	5%	95%	—	*1,000*	3	25M	1	—
W Br Lt Bushkill	Wind Gap	8 06 70	31	40%	60%	—	1,000	2	4M	14	—
W B Lt Bushkill	Wind Gap	3 01 70	31	10%	90%	—	500	1	1M	—	3
Silver Lake	Yardley	5 28 70	11	99%	1%	—	2,000	2	28A	—	—
Trib to Mill Creek	York	9 11 70	26	15%	85%	—	1,048	2	2M	2	—
SOUTH CAROLINA											
Lake Secession	Anderson	9 13 70	24	55%	45%	—	7,560	2	10A	—	4
Lynches River	Bishopsville	4 28 70	24	—	—	—	5,000	3	50M	—	19
Hartwell Reser	Clemson	5 08 70	31	10%	90%	—	8,000	2	20A	—	12
Gills Creek	Columbia	7 02 70	31	5%	95%	—	3,000	2	1M	—	24
Huff Creek	Greenville	4 24 70	24	16%	84%	—	237	1	3M	1	—
Simpson Creek	Red Bluff	6 05 70	11	70%	30%	19%	6,357	1	8M	—	24
Lake Harwell	Seneca	4 28 70	31	30%	70%	—	3,000	3	200A	3	—
TENNESSEE											
Costanaula Creek	Athens	8 22 70	31	—	—	—	—	3	—	—	—
South Mouse Creek	Cleveland	9 14 70	26	—	—	—	375	4	—	—	—
Little Bigby Creek	Columbia	8 15 70	25	2%	98%	—	14,225	3	4M	6	—

Duck River	Columbia	6	13	70	24	5%	95%	—	762	4	13M	2	—
Pigeon Roost Creek	Cookeville	5	05	70	31	5%	95%	—	44	4	—	—	—
Long Creek	Dandridge	8	20	70	11	35%	65%	—	250	4	—	—	—
E Piney-Piney River	Dickson	5	17	70	31	5%	95%	—	82,224	2	12M	1	—
South Indian Creek	Erwin	5	28	70	42	1%	99%	—	27,664	2	7M	1	—
Caney Creek	Harriman	5	12	70	31	30%	70%	—	3,267	2	2M	—	5
Horse Creek	Kingsport	10	24	70	24	3%	97%	—	1,676	3	1M	—	5
Shoal Creek	Lawrenceburg	1	30	70	26	33%	67%	—	111,397	2	24M	—	12
Mckellar Lake	Memphis	9	05	70	31	—	100%	—	100,100	2	100A	—	—
Mckellar Lake	Memphis	7	06	70	31	1%	99%	—	58,714	2	100A	—	—
Cypress Creek	Middleton	10	24	70	31	—	100%	—	25	4	1M	—	—
Sugar Creek	Mt Pleasant	5	09	70	24	5%	95%	—	3,366	2	5M	3	—
Big Bigby Creek	Mt Pleasant	7	14	70	24	—	100%	—	99,236	2	5M	2	—
Stones River	Murfreesboro	8	19	70	31	88%	12%	—	19,545	2	3M	1	—
Stones River	Murfreesboro	8	02	70	31	—	—	—	200	4	1M	—	6
Stones River	Murfreesboro	7	17	70	31	—	—	—	150	4	1M	—	6
Mill Creek	Nashville	10	16	70	31	45%	55%	—	558	4	1M	—	4
Mill Creek	Nashville	8	02	70	31	30%	70%	—	3,047	2	1M	1	—
Hurricane Br	Doltewah	8	—	70	13	1%	99%	—	500	3	—	1	—
Little Pigeon Rver	Sevierville	3	03	70	24	1%	99%	—	1,323	3	4M	—	5
Cover & Woldea Cr	Sevierville	6	30	70	13	7%	93%	—	23,432	2	7M	—	2
East Friar Br	Silverdale	2	—	70	31	33%	67%	—	96	4	—	—	—
Town Creek	Smithville	7	20	70	31	—	—	—	88	4	1M	1	—
Trace Creek	Waverly	9	01	70	31	10%	90%	—	29,057	2	2M	—	—
Stones R-East Fk	Woodbury	8	—	70	31	—	—	—	75	1	—	—	—
TEXAS													
Perry Bayou	Alvin	7	10	70	24	—	—	—	2,000	4	1M	—	—
Chocolate Bayou	Alvin	8	08	70	24	—	100%	100%	20,000	3	—	—	—
Turtle Bayou	Anahuac	2	08	70	41	10%	90%	—	2,000	2	20M	4	—
Scott Day	Baytown	9	03	70	27	—	100%	85%	250,000	3	—	1	—
Black Duck Bay	Baytown	8	17	70	27	—	100%	10%	200	4	10A	1	—
Unnamed Stream	Beaumont	2	06	70	25	5%	95%	—	—	3	10M	4	—
San Jacinto River	Channelview	8	04	70	27	1%	99%	98%	2,700,000	2	1M	1	—
Caney Creek	Conroe	5	28	70	41	—	—	—	30,000	2	3M	—	—
Unnamed Stream	Conroe	11	27	70	25	25%	75%	—	—	1	6M	3	—
Corpus Chris-Bay	Corpus Christi	10	06	70	12	50%	50%	—	1,000	4	1A	1	—
Twelve Mile Creek	Cuero	6	21	70	25	20%	80%	—	2,000	1	3M	—	—
Middle Banard River	Eagle Lake	4	25	70	25	10%	90%	—	—	2	3M	2	—
Grape Creek	Fredericksburg	9	30	70	13	70%	30%	—	—	—	3M	—	6
Creek	Gainesville	2	01	70	25	50%	50%	—	5,000	2	3M	12	—
Private Boat Ca	Galveston	5	27	70	31	—	100%	100%	500	4	—	—	12
Private Pond	Galveston	6	19	70	50	50%	50%	—	50	4	—	—	—
Duck Creek	Garland	3	02	70	28	20%	80%	—	150	4	1M	3	—
Mouth Dischg Ca	Glen Cove	5	15	70	28	5%	95%	10%	772,000	1	1M	—	—
Sabine River	Grand Saline	8	29	70	21	5%	95%	—	—	—	3M	—	—
Hadley Creek Trib	Huntsville	4	11	70	32	2%	98%	—	2,250	2	3A	1	—
San Jacinto Bay	La Porte	9	02	70	27	—	100%	85%	1,000	4	—	1	—
Houston Channel	La Porte	8	25	70	50	1%	99%	80%	500,500	2	3M	2	—
Unnamed Priv La	Liberty	4	15	70	25	—	100%	—	100	4	—	2	—
Grace Creek	Longview	3	02	70	31	5%	95%	—	300	4	2M	1	—
Sabine River	Longview	3	05	70	24	15%	85%	—	500	3	1M	—	—
Intracoastal W W	Matagorda	5	02	70	44	—	—	—	1,000	2	1M	—	—
Cottonwood Br	Paris	5	05	70	24	75%	25%	—	—	1	2M	—	—
Hillebrandt Bayou	Port Arthur	3	06	70	31	26%	74%	10%	90,000	2	2M	—	12
Chapaderas Creek	San Antonio	6	11	70	50	50%	50%	—	20,000	1	—	1	—
San Antonio River	San Antonio	8	04	70	31	50%	50%	—	10,000	2	2M	2	—
Leon Creek	San Antonio	5	16	70	28	10%	90%	—	1,000	3	—	—	—
Salado Creek	San Antonio	6	05	70	44	50%	50%	—	1,000	4	—	—	—
Harbor-Texas City	Texas City	6	24	70	27	—	100%	100%	1,000	3	—	1	—
Drainage Ditch	Texas City	7	16	70	50	—	100%	100%	200	4	1M	—	—
Industrial Canal	Texas City	9	11	70	24	1%	99%	80%	1,500	4	1M	1	—
Pump Discharge Ca	Texas City	8	26	70	27	—	100%	—	1,000	3	2M	1	—
Harbor-Texas Cty	Texas City	9	21	70	27	5%	95%	80%	2,000	4	—	—	—
Moses Lake	Texas City	6	30	70	31	—	100%	100%	300,000	2	—	1	—
Galveston Bay	Texas City	5	31	70	50	10%	90%	10%	10,000	2	—	1	—
Moses Bayou	Texas City	8	05	70	31	1%	99%	95%	100,000	2	1M	1	—
Spring Creek	Tomball	2	16	70	28	—	—	—	—	2	—	—	—
Trinity River	Trinity	9	09	70	31	—	—	—	—	—	—	—	—
Buffalo Lake	Umbarger	1	01	70	13	90%	10%	—	40,000	2	—	30	—
Tehuacana Creek	Waco	12	03	70	31	5%	95%	—	300	3	—	—	—
White Oak Creek	Wilkerson	11	—	70	25	15%	85%	—	200	1	1M	2	—
UTAH													
Ogden River	Ogden	2	09	70	33	65%	35%	—	300	1	1M	—	—
VERMONT													
East Creek	Rutland	10	06	70	35	—	100%	—	300	2	2M	3	—
Whetstone Brook	W Brattleboro	6	17	70	50	—	100%	—	2,000	3	1M	1	—
VIRGINIA													
Bluestone River	Bluefield	10	07	70	25	—	100%	—	40	4	—	—	—
Clinch River	Carbo	6	19	70	35	—	100%	—	5,300	1	14M	3	—
Farmington Pond	Charlottesville	3	27	70	11	—	—	99%	102	2	—	—	—
Mechum River	Crozet	11	30	70	11	1%	99%	—	2,324	3	22M	14	—
Lickinghole Creek	Crozet	6	28	70	27	5%	95%	—	1,953	2	3M	3	—
Cooks Creek	Dayton	9	23	70	31	—	100%	—	6	4	5M	—	—
Lt Hunting Creek	Fairfax	7	31	70	31	99%	1%	—	300	3	1M	2	—
Thompson Creek	Finney	8	25	70	41	—	100%	—	36	1	5M	2	—
Private Pond	Halifax	8	12	70	11	100%	—	—	200	2	1A	—	—
Hawksbill Creek	Luray	7	01	70	28	40%	60%	—	350	2	3M	2	—
New River	Narrows	7	09	70	28	40%	60%	—	16,288	1	5M	—	—
James River	Richmond	7	21	70	31	50%	50%	25%	13,655	2	7M	2	—
Falling Creek	Richmond	6	05	70	21	75%	25%	—	450	2	7M	1	—
Roanoke River	Roanoke	7	07	70	26	10%	90%	—	90	3	2M	—	—
Carvins Creek	Roanoke	7	15	70	31	20%	80%	—	67	2	2M	2	—
North Anna River	Ruther Glen	7	10	70	21	50%	50%	—	24	3	10M	—	—
Roanoke River	Salem	10	10	70	24	30%	70%	—	13,381	1	5M	2	—
Lake Joyce	Virginia Beach	3	12	70	50	—	—	100%	180	3	12A	1	—
Turkey Run	Warrenton	5	08	70	42	10%	90%	—	11,000	1	10M	2	—

Report of Fish Kills, 1970—Cause Identifiable

Table 12
CONTINUED

Body of water	City or town	Date	Cause [1] see code page 18	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 18	Estimated miles or acres affected	Duration: Days	Duration: Hrs.
WASHINGTON											
Trib of White River	Auburn	3 03 70	24	100%	—	—	500	1	2M	1	—
Valley Creek	Bellevue	4 28 70	24	100%	—	—	100	3	1M	1	—
North Creek	Bothell	5 13 70	25	100%	—	—	4	4	1M	1	—
Colville River	Chewelah	7 30 70	11	5%	95%	—	145,000	1	14M	2	—
Patit Creek	Dayton	5 06 70	12	1%	99%	—	114	3	2M	1	—
Des Moines Creek	Des Moines	8 28 70	24	90%	10%	—	500	2	2M	—	24
Des Moines Creek	Des Moines	6 17 70	11	30%	70%	5%	505	—	1M	1	—
Everett Harbor	Everett	11 23 70	23	50%	50%	—	—	2	—	2	—
Unnamed Creek	Kenmore	8 13 70	24	100%	—	—	25	4	1M	1	—
Swamp Creek	Lynnwood	7 01 70	24	100%	—	—	3,000	2	1M	1	—
Wildcat Creek	McCleary	3 27 70	24	100%	—	—	11,065	2	4M	2	—
Trib of Carbon R	Orting	3 30 70	24	100%	—	—	120	1	2M	1	—
Puget Sound	Poulsbo	12 14 70	25	—	100%	—	—	—	5M	2	—
Willapa River	Raymond	5 25 70	23	100%	100%	100%	10,000	2	—	2	—
Beaver Creek	Toppenish	7 07 70	24	10%	90%	—	500	2	1M	1	—
WEST VIRGINIA											
Buckhannon River	Buckhannon	6 10 70	21	90%	10%	—	500	2	4M	5	—
Elm Run	Cairo	10 02 70	44	1%	99%	—	2,800	2	1M	1	—
Kanawha River	Charleston	5 25 70	24	9%	91%	—	500	3	5M	1	—
Big Ditch Run	Cowen	9 16 70	12	10%	90%	—	1,500	2	1M	1	—
Rocky Fork	Cross Lanes	8 13 70	31	1%	99%	—	1,000	3	1M	2	—
Rt Fk Freemans C	Freemansburg	7 08 70	25	33%	67%	—	7,500	1	2M	2	—
Little Huff Creek	Hanover	6 03 70	42	2%	98%	—	10,102	2	2M	1	—
Stonecoal Creek	Weston	5 12 70	21	50%	50%	—	2,000	1	4M	4	—
Wheeling Creek	Wheeling	10 23 70	42	—	100%	—	10,000	3	6M	—	9
WISCONSIN											
Chippewa River	Eau Claire	6 19 70	23	50%	50%	—	40	4	1M	—	1
Scotch Creek	Edgar	6 21 70	22	5%	95%	—	3,000	2	2M	7	—
Black Creek	Fairchild	9 11 70	44	75%	25%	—	28,000	2	5M	8	—
Crawfish River	Fall River	9 01 70	13	25%	75%	—	500	2	3M	7	—
Fox River	Green Bay	4 27 70	31	10%	90%	—	—	3	4M	2	—
Fox River	Little Chute	7 29 70	31	5%	95%	—	2,000	—	3M	4	—
Upper Mud Lake	Madison	4 11 70	31	100%	—	—	140,000	1	330A	15	—
Fox River	Menasha	9 30 70	42	80%	20%	—	200	4	1M	—	6
Neenah Slough	Neenah	3 24 70	23	40%	60%	—	500	3	1M	2	—
N Fk Bad Axe River	Newton	7 29 70	11	24%	76%	—	14,277	2	10M	1	—
Oconto River	Oconto Falls	9 07 70	23	5%	95%	—	80,000	2	12M	5	—
Roundtree Br	Platteville	7 11 70	31	18%	72%	—	746	1	2M	73	—
Lt Suamico River	Polaski	9 12 70	31	40%	60%	—	100	4	1M	1	—
N Fk Eau Claire	Thorpe	6 17 70	13	—	100%	—	4,000	3	3M	1	—
Moccasin Creek	Wisc Rapids	7 23 70	24	1%	99%	—	100,000	2	4M	5	—
WYOMING											
N Crow Reservoir	Cheyenne	3 13 70	33	70%	30%	—	1,000	3	10A	2	—
Fk Popo Agie R	Lander	7 20 70	34	80%	20%	—	200	3	1M	—	2

CODES

[1] Cause:
10 AGRICULTURAL OPERATIONS
11 Poisons (pesticides,)
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

Body of water	City or town	Date	Cause (90)	Type of fish killed: Percent game	Type of fish killed: Percent non-game	Percent kill with commercial value	Est. fish killed	Severity[1] code page 21	Est. miles or acres affected	Duration Days	Duration Hrs.
ALABAMA											
Dog River	Mobile	7 12 70		—	100%	100%	800,000	2	2M	2	—
ARKANSAS											
Carters Lake	Faulk	7 04 70		—	—	—	—	3	18A	1	—
Caney Bayou	Pine Bluff	8 21 70		18%	82%	30%	10,000	2	5M	2	—
CALIFORNIA											
Mill Pond	Anderson	1 11 70		20%	80%	—	260	1	2A	—	—
Morrison Slough	Butte County	7 22 70		25%	75%	—	40	—	3M	—	—
Dominie-Rowdy Cr	Del Norte Co	7 31 70		95%	5%	—	400	—	—	—	—
7 Min 5 Points	Fresno County	7 09 70		100%	—	—	3	—	—	—	—
Pacific Ocean Be	Humboldt County	7 28 70		70%	30%	30%	39,000	—	—	—	—
Pond Nr Hwy 120	Lathrop	6 04 70		70%	30%	—	1,075	—	—	—	24
Reseda Lake	Los Angeles Co	7 01 70		100%	—	—	3,000	—	—	—	—
Malibu Creek	Malibu	3 16 70		3%	97%	—	20,730	3	4M	1	—
Tierney Ra-Pit R	Pittville	7 19 70		50%	50%	—	400	—	—	—	—
Slough	Ripon	7 01 70		75%	25%	—	75	—	—	—	—
Morrison Creek	Sacramento	4 01 70		10%	90%	—	935	1	5M	—	—
Russian River	Sonoma County	5 18 70		2%	98%	—	71	—	1M	—	—
San Joaquin Riv	Stevinson	11 22 70		30%	70%	—	4,000	2	7M	2	—
Calaveras River	Stockton	4 08 70		50%	50%	—	500	3	2M	—	—
Salt Creek	Tehama County	7 08 70		—	—	—	300	—	—	—	—
CONNECTICUT											
Quinnipiac River	Southington	7 27 70		—	100%	—	300	2	2M	—	—
FLORIDA											
Glenada	Avon Park	12 23 70		2%	98%	—	284	4	—	1	—
Lake Holloway	Lakeland	7 02 70		100%	—	—	550	3	25A	3	—
English Creek	Plant City	4 20 70		100%	—	—	—	3	—	—	—
GEORGIA											
Lake Blackshear	Cordele	1 09 70		95%	5%	5%	10,000	4	8515A	7	—
Str Paulding Co	Powder Springs	1 11 70		10%	90%	—	500	3	—	—	—
HAWAII											
Niu Stream	Honolulu	9 02 70		100%	—	100%	600	1	1M	—	—
Kewalo Basin	Honolulu	6 11 70		67%	33%	100%	—	2	5A	2	—
Miliwai Canal	Honolulu	7 01 70		—	—	100%	350	1	1M	1	—
Paiko Lagoon	Honolulu	3 22 70		98%	2%	100%	1,430	2	39A	1	—
Kapakahi Canal	Honolulu	4 24 70		100%	—	100%	150	4	1M	—	—
West Loch	Waipahu	5 13 70		—	—	100%	—	4	—	1	—
ILLINOIS											
Gar Creek	Kankakee	7 24 70		12%	88%	10%	9,926	2	—	—	—
Macoupin Creek	Standard City	6 28 70		44%	56%	33%	19,671	3	7M	4	—
INDIANA											
Whitelick Creek	Avon	9 21 70		50%	50%	—	944	2	1M	—	—
Cheney Creek	Fishers	8 23 70		20%	80%	—	5,000	2	5M	—	—
Muddy Fork Creek	Greensburg	8 28 70		50%	50%	—	200	4	—	—	—
Sugar Creek	Needham	7 07 70		70%	30%	—	4,800	—	1M	—	—
Spring Lake	Spring Lake Pk	8 21 70		50%	50%	—	2,500	3	8A	—	—
KANSAS											
Smoky Hill River	Ellsworth	6 15 70		10%	90%	10%	600	4	1M	1	—
Terrapin Creek	Hamlin	6 30 70		30%	70%	30%	200	3	1M	2	—
Milford Res	Junction City	7 01 70		100%	—	100%	6,750	4	15800A	90	—
Wolf River	Leona	7 31 70		30%	70%	35%	800	3	7M	1	—
Marion Reservoir	Marion	8 03 70		60%	40%	80%	86,000	3	6160A	50	—
KENTUCKY											
Bays Fork Creek	Allen County	4 16 70		—	—	—	31,664	—	3M	—	—
South Fork Creek	Barren County	8 15 70		—	—	—	50	—	2M	—	—
Sugartree Run Cr	Bullitt County	3 27 70		—	—	—	1,000	—	2M	—	—
Marrowbone Creek	Burksville	7 06 70		—	—	—	79,080	1	4M	—	—
Mayfield Creek	Graves County	6 30 70		—	—	—	2,000	—	10M	—	—
Tennessee River	Marshall County	7 16 70		—	—	—	300	—	—	—	—
Clarks Cr	McCracken Co	5 18 70		—	—	—	75	—	1M	—	—
Russell Fork	Pike County	2 08 70		—	—	—	1,000	—	—	—	—
Ohio River	Shirley-Valley	8 20 70		1%	99%	—	44,675	2	16M	—	—

Report of Fish Kills, 1970—Cause Unknown

Table 13

CONTINUED

Body of water	City or town	Date	Cause (90)	Type of fish killed: Percent game	Type of fish killed: Percent non-game	Percent kill with commercial value	Est. fish killed	Severity [1] code page 21	Est. *miles or* acres affected	Duration Days	Duration Hrs.
MICHIGAN											
Lake Columbia	Jackson County	8 10 70		—	—	—	7,500	2	—	—	—
Portage Creek	Kalamazoo	9 16 70		—	—	—	200	4	—	—	—
Jordan Lake	Lake Odessa	4 29 70		95%	5%	—	2,000	2	—	—	—
MINNESOTA											
Rice Lake-Crow R	Eden Valley	8 14 70		50%	50%	—	2,000	2	10A	—	—
Root River	Preston	9 — 70		—	—	—	—	2	7M	—	—
MISSOURI											
Fenton Creek	Fenton	11 15 70		1%	99%	—	6,000	2	—	—	—
Big Creek	Glover	8 21 70		—	100%	—	35	4	1M	1	—
Williams Creek	Mt Vernon	7 14 70		5%	95%	—	450	4	1M	—	—
Turkey Creek	Puxico	7 17 70		60%	40%	—	550	2	3M	—	—
NEBRASKA											
Salt Creek	Ashland	4 24 70		30%	70%	—	70	4	2M	—	3
Clear Creek	Columbus	6 — 70		5%	95%	—	—	2	2M	3	—
Lake I-80	Cozad	5 — 70		100%	—	—	820	2	19A	21	—
I-80 Lake 284N	Kearney	5 — 70		100%	—	10%	464	2	12A	—	—
North Fork River	Norfolk	8 12 70		—	100%	—	300	—	1M	—	6
North Fork River	Norfolk	9 25 70		—	100%	—	600	4	3M	—	—
Ziegler Pond	Scottsbluff	7 22 70		100%	—	—	325	3	3A	2	—
Swa Lake 370N	Wood River	9 03 70		10%	90%	75%	—	3	17A	7	—
NEW HAMPSHIRE											
Crystal Lake	Manchester	7 01 70		16%	84%	—	—	4	19A	—	—
Crystal Lake	Manchester	6 30 70		10%	90%	—	60	4	19A	—	—
Sondogardy Pond	Northfield	6 10 70		—	100%	—	81	4	41A	—	—
Silver Lake	Tilton	6 19 70		—	100%	—	500	3	216A	2	—
NEW JERSEY											
Deal Lake	Asbury Park	8 21 70		—	100%	—	1,000	3	1A	5	—
Hackensack River	Carlstadt	10 14 70		—	100%	—	10,000	3	1M	2	—
Millstone River	E Windsor Twp	7 17 70		—	—	—	—	2	2M	—	8
Bob Elwoods Pond	Imlaystown	6 14 70		—	100%	—	50	1	—	—	8
Kirkwood Lake	Kirkwood	5 20 70		—	100%	—	250	—	—	—	—
Belle Mt Park La	Lambertville	6 05 70		—	100%	—	150	4	3A	1	—
Hackensack Molds	Lyndhurst-N Arl	9 23 70		—	100%	—	10,000	3	1M	1	—
Watnong Brook	Morris Plains	7 02 70		—	100%	—	2,500	2	1M	—	8
Harrys Brook	Princeton	6 11 70		50%	50%	—	100	4	1M	—	2
Grover Mill Pond	Princeton Jnctn	5 29 70		—	100%	—	100	4	—	—	—
Millstone River	Rocky Hill	8 10 70		—	100%	—	100	3	—	—	8
Briant Pond	Summit	9 16 70		—	100%	—	250	3	4A	1	—
NEW YORK											
Fall Creek	Ithaca	4 25 70		—	100%	—	200	—	1M	—	—
W End L I Sound	New York City	8 08 70		—	—	100%	35,000	2	—	—	—
Seneca River	Waterloo	7 30 70		10%	90%	—	300	2	1M	1	—
NORTH CAROLINA											
Deep River	High Point	5 31 70		68%	32%	—	1,500	4	1M	—	24
End River	Hillsboro	6 14 70		6%	94%	—	250	4	3M	—	6
Ivy River	Mars Hill	6 04 70		—	100%	—	1,000	4	2M	—	12
Lake Tillery	Norwood	8 15 70		62%	38%	18%	3,000	3	—	—	24
French Broad Riv	Pisgah Forest	8 12 70		8%	92%	5%	5,000	2	—	—	—
Chowan River	Tunis	9 17 70		—	—	100%	—	4	2M	—	—
NORTH DAKOTA											
Red River	Fargo	9 30 70		10%	90%	—	12,000	1	3M	—	—
OKLAHOMA											
Stink Creek	Altus	10 06 70		1%	99%	—	1,500	2	1M	2	—
PENNSYLVANIA											
Chartiers Creek	Canonsburg	6 06 70		100%	—	—	462	3	5M	1	—
Driftwood Br	Emporium	5 09 70		1%	99%	—	500	4	12M	—	—
West Valley Creek	Exton	7 12 70		40%	60%	—	7,484	1	5M	—	24
Freemansburg Canal	Freemansburg	5 15 70		100%	—	—	506	4	1A	—	1
Red Clay Creek	Kennett Square	8 27 70		2%	98%	—	1,837	3	1M	2	—
Lt Wisconisco Creek	Killinger	8 12 70		100%	—	—	200	4	3M	—	—
Delaware River	Portland	6 12 70		—	100%	—	50	4	1M	—	—

RHODE ISLAND										
Meshanticut Pond	Cranston	5 — 70	100%	—	—	50	3	5A	—	—
SOUTH CAROLINA										
3 & 20 Creek	Anderson	4 21 70	84%	16%	—	87	4	1M	—	—
Sanders Branch	Hampton	5 19 70	75%	25%	—	11,573	1	5M	1	—
Lawson Fork	Valley Falls	7 30 70	25%	75%	—	800	2	1M	—	3
SOUTH DAKOTA										
Menno Lake	Menno	8 22 70	70%	30%	—	7,000	4	45A	—	—
TENNESSEE										
Hiwassee River	Charleston	5 15 70	—	100%	—	50	4	5A	1	—
Hiwassee River	Charleston	6 06 70	2%	98%	—	1,609	3	8M	—	—
Watts Bar Lake	Chattanooga	4 — 70	—	100%	—	60	4	5A	—	—
S Chickamauga Creek	Chattanooga	9 10 70	—	—	—	10,000	2	1M	1	—
Deshea Creek	Gallatin	8 — 70	—	—	—	250	4	—	1	—
Richland Creek	Nashville	11 — 70	5%	95%	—	3,000	—	—	—	—
TEXAS										
New Bayou	Alvin	6 16 70	5%	95%	95%	111,000	2	3M	—	—
Dickinson Bayou	Dickinson	9 14 70	2%	98%	98%	219,000	2	2M	—	—
Freeport Harbor	Freeport	8 06 70	5%	95%	80%	1,000,000	2	5M	2	—
Cole Creek	Houston	4 15 70	20%	80%	10%	300	2	1M	2	—
Jones Creek	Jones Creek	1 28 70	50%	50%	25%	200	3	2M	1	—
Cedar Bayou	Mont Belview	6 15 70	25%	75%	20%	500	3	2M	—	—
Marys Creek	Pearland	7 27 70	1%	99%	—	100	4	1M	—	—
Main A Canal	Port Arthur	1 19 70	—	—	—	—	—	3M	7	—
Seawall Bar Ditch	Texas City	12 11 70	1%	99%	5%	1,000	1	10A	2	—
Trinity River	Wilson Shoals	7 05 70	—	—	—	35,000	3	20M	2	—
VIRGINIA										
Private Pond	Elkton	5 16 70	100%	—	—	150	3	—	—	—
Falling Creek	Richmond	6 25 70	—	—	90%	202	3	1M	1	—
Swift Creek Reservoir	Richmond	5 03 70	4%	96%	—	425	3	5A	—	—
WASHINGTON										
Private Pond	Edmonds	7 20 70	100%	—	—	20	1	1A	1	—
Lake Washington	Kenmore	6 18 70	100%	—	—	10	4	1A	14	—
Cedar River	Landsburg	7 21 70	100%	—	—	200	3	1M	1	—
Wildcat Creek	Mc Cleary	5 14 70	70%	30%	42%	2,000	2	5M	1	—
Puget Sound	Seattle	7 23 70	100%	—	—	—	4	2A	1	—
Sekiu River	Sekiu	7 17 70	80%	20%	—	1,000	3	1M	1	—
Hylebos Waterway	Tacoma	6 25 70	—	100%	100%	15,000	2	2M	4	—
Walla Walla River	Touchet	7 28 70	1%	99%	—	150	4	1M	1	—
Deschutes River	Vail	7 13 70	100%	—	—	10	4	1M	1	—
WEST VIRGINIA										
New R-Bluestn Lake	Hinton	4 13 70	5%	95%	—	5,000	3	6M	12	—
Guyandot River	Huntington	10 06 70	5%	95%	—	500	4	2M	2	—
WYOMING										
Powell Gravel Pond	Powell	1 23 70	70%	30%	—	50	4	1M	1	—
Big Horn River	Worland	8 08 70	26%	74%	—	8,000	3	20M	1	—

[1] Severity: 1 Complete 2 Heavy 3 Moderate 4 Light.

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