

ROINN NA MARA



FISH KILLS IN IRELAND IN 1989

by

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Summary

The final estimate for the number of fish kills in 1989 was 111. The increase in 1989 is largely accounted for by the exceptional warm weather conditions which prevailed.

Details of all the incidents are given in the following pages. When these are analysed some very significant facts emerge. The number of fish kills while higher than in 1988 (50 kills) was about nine percent lower than in 1987 (122 kills). Low water due to dry weather conditions was the most important factor in 1989 raising the number of kills by 50%. Despite weather conditions, fish kills due to agricultural causes showed little change on the 1988 level - thus maintaining the substantial reduction in kills due to these causes achieved in 1988.

As many as 50 of the incidents resulted from pollution which in a normal wet summer would not have caused such serious damage. These problems give a useful, if painful, reminder that water pollution can have devastating results. They also serve to highlight high risk situations.

Many of the 1989 fish kills resulted from a shortage of oxygen from untraceable causes, for example from excessive plant growth due to fertiliser run-off or domestic sewage - or both. Others came from identifiable sources. In about half these cases the authorities felt that genuine accidents had happened and a warning to the guilty party was all that was needed. In others, twenty-seven in all, legal proceedings were set in motion.

Fish kills in 1989

After a promising beginning to the year, the incidence of fish kills began to increase rapidly from mid-May. By the end of July the total of 100 was very much worse than the year before and only marginally better than the "disaster" year 1987 (Figure 1). The situation improved a little in August and only two incidents were recorded for the rest of the year.

A number of factors have contributed to the high numbers. For the first time, comprehensive reports have been received from Local Authorities in addition to those from the Water Pollution Officers of the Regional Fisheries Boards. These increased the number of incidents actually reported. It is also possible that the total includes some minor incidents likely to have gone un-noticed in the past.

However, this important development of co-operation could not explain the increase of more than 100% over the previous year. The principal factor was the long, hot summer of 1989. The graph in Figure 2 gives rainfall data provided by the Meteorological Service. The below-average rain in May and July led to very low levels in rivers throughout the country. As a result levels of pollution, which would have given no obvious trouble in a normal year, caused many fish kills in 1989.

Extent of the kills

Regional distribution of the kills is given in Table 1, together with the localities and the length of stream affected. The named localities are the nearest ones shown on the half-inch Ordnance Survey maps and not necessarily the source of pollution. Distribution follows the usual pattern of serious problems in the more densely populated parts of the country with very little trouble coming from the western rivers. In more than half the cases a relatively short length of river was involved, less than 1 km. Reports for some of the very long stretches did not indicate major fish kills, the numbers of dead fish being small.

Species affected

Trout and salmon were the species most frequently killed (Table 2). This results partly from their being the most susceptible to pollution since they require water of a very high quality. Their high mortality rate is also connected with the habitat. The coarse fish by and large live in the lakes and large rivers in which effluents are diluted to a much greater degree than in the smaller streams.

Causes

The pie-diagrams in Figure 3 show the percentages of kills caused by the main sources of pollution. The actual figures are given in Tables 3 and 4. The incidence of agriculture as the major factor continued to fall from its peak in 1987, accounting for only one quarter of the kills in 1989. The numbers were much the same in the two years: 27 in 1989 and 25 in 1988. "Agriculture" in this context is confined to incidents caused by effluent from specific farmyards or from such sources as slurry tankers. It is therefore separated from the next two, deoxygenation and enrichment, which in many cases result from leaching of fertilisers and from untraced farm wastes. Sewage and industrial effluents, however, may be involved in some of these.

"Deoxygenation" is given as the cause of 23% of the incidents in 1989 and could be implicated in the "unknowns" in both years. It is a very broadly applied term which reflects the weather conditions. Low stream flows combined with high temperatures and very dense growth of water weed all lead to a situation where oxygen is depleted seriously during the hours of darkness. It has much in common with "enrichment" which was an important factor in both years. The latter term is used more in connection with excessive algal growth due to high phosphate levels in the water while "deoxygenation" covers problems often caused by rooted vegetation rather than algae.

A combination of non-agricultural causes explain the remaining incidents. These had a greatly increased incidence in 1989, rising from 12% to 23%. Sewage had completely disappeared from the list in 1988 but was back again as a serious problem.

Some of the kills remain unexplained. The most perplexing was Ardagh lake in Co. Monaghan where trout died on two occasions after being stocked. An exhaustive study was made of the water in the lake and pathological tests were made on the dead fish. The water quality appeared to be excellent and the fish showed no disease symptoms.

Five cases of poachers using chemical to kill fish were reported. Considerable numbers of dead salmon were found during the spawning season. Many of these had died after spawning, a regular occurrence which does not give rise to any concern. Some, however, had not spawned or had only partially spawned and disease was suspected.

Remedial action

The "deoxygenation", "enrichment" and "unknown" causes generally did not merit prosecution. In 25 cases, many of them caused by accident, officials advised the responsible parties on how to avoid a repetition. Investigations were still in progress in 21 cases and compensation claims for restocking were made in two. Prosecutions were either taken or being prepared for the remaining 27 incidents.

Conclusions

The high number of fish kills reported in 1989 was a very disappointing development following the great improvement in the situation which had taken place the year before. In spite of it, there were some encouraging signs.

Above all, there was no increase in the numbers of incidents caused directly by agricultural effluents. After the serious damage from this source caused in 1987 a major information campaign was launched. The apparent success of this exercise was demonstrated by the results in 1988 when the number of fish kills was halved. Because of the dry weather in 1989 an increase in the problem from agriculture should have taken place. The fact that it did not indicates that the trend of improvement was continuing.

The upswing in the numbers of fish kills from other sources, particularly industrial and "civil works", did not necessarily prove that pollution was worse than previously. Since 1984 these had resulted in small numbers of kills at a fairly steady rate per annum. The conclusion is that the pollution load probably did not increase - but it had a dramatic effect.

The most difficult cases to deal with are the major ones of deoxygenation and enrichment. Fertiliser run-off is implicated in many of the latter. In particular, the three fish-kills in the River Lee were associated with algal blooms which can only be explained by run-off from many farms. Deoxygenation was described in some reports as "natural causes". However, the question must be asked whether any of our streams nowadays are completely free from some traces of artificial fertiliser. Such traces would enhance the growth of rooted vegetation which can bring about severe oxygen depletion in salmonid nursery streams in dry weather.

Two important observations may be made. Firstly, the effort put into solving water pollution problems has come up with impressive results. Secondly, fish kills in years with normal summer rainfall reveal only a small proportion of pollution incidents: in dry summers many of these are shown up.

The ultimate aim must be for no fish kills in the next long hot summer.

Acknowledgements

Information on the fish kills was provided by the Water Pollution Officers of the Regional Fisheries Boards and by Local Authority officials. The assistance of Mr Michael Egan and his colleagues in the Department of the Environment is gratefully acknowledged.

Fish kill reports

Reports are published annually in the Department of the Marine Fishery Leaflet Series. Previous issues are:

- 128. Fish kills in Ireland: an analysis of incidents in 1983 and 1984. Edward Fahy.
- 132. Fish kills in Ireland in 1985. Edward Fahy.
- 141. Fish kills 1969-1987. Desmond McCarthy.
- 143. Fish kills in Ireland 1988. Desmond McCarthy and Christopher Moriarty.

Table 1. Regional distribution of fish kills in 1989 with estimated stream lengths in metres.

Eastern Region		Total : 28	
Mar 1	Ardaghy Lake	Monaghan H6630	
Apr 21	Ardaghy Lake	Monaghan H6630	
May 1	Bridgetown (trib.)	Bridgetown T0010	300
29	Royal Canal	Ashtown O1037	2000
June 1	Rohans L.(trib)	Kingscourt N8399	300
13	Blackwater	Monaghan H6736	400
13	Royal Canal	Ashtown O1037	1000
16	Swan River	Bray O2518	3200
17	Blackwater	Glaslough H7242	
20	Derry Water	Sandyfordbridge T0379	400
21	Dee	Annagassan O0892	
26	Boyne	Boyne Bridge N6334	10000
28	Martry	Cortown N7571	800
July 1	Yellow River	Rhode N5336	7000
2	Newtown	Bohermeen N7770	10000
4	Tyolland	Monaghan H7235	400
5	Broadmeadow (trib.)	Ashbourne H0552	100
7	Mountain Water	Emyvale H6944	400
9	Rye	Leixlip N9937	600
16	Blackwater	Faulkland H7138	200
17	Moynalty R.	Moynalty N7382	5000
19	Derreen	Hacketstown S9680	5000
20	Castletown	Dundalk J0309	100
23	Dee (trib.)	Delvin N5861	50
25	Blackwater	Moy Bridge H6751	5000
30	Barora	Moynalty N7185	1000
Aug 11	Proules	Carrickmacross H8430	1000
25	Derreen (trib.)	Tankardstown S8874	40
Southern Region		Total : 24	
Apr 22	Grand Canal	Monasterevin N6210	
24	Grand Canal	Edenderry N6332	
May 22	Fushoge	Carlow S6678	1000
23	Triogue	Portlaoise N4900	4000
Jun 12	Nurney	Nurney N7268	5000
14	Boherbawn	Kildare N7212	500
14	Cushina	Clonygowan N4715	
14	Mountrath (trib.)	Ballyfin N3800	150
18	Suir	Templemore S1269	1500
19	Glenaboy	Tallow W9993	1200
21	Barrow	Rearvalley	300
21	Owentaraglin	Kishkeam R2003	4000
22	Grand Canal	Rathangan N6719	
July 6	Acore	Barraghcore S6757	500
9	Anner	Clonmel S2422	800
12	Clodiagh	Clonaslee	1000
16	Clashawley	Fethard S2134	500
16	Clonmore/Suir	Templemore S1271	5000
19	Suir	Kilsheelan S2923	5000
21	Acore	Goresbridge S6757	2000
21	Barrow	Mountmellick N4609	1500
26	Dinin (trib.)	Castlecomer S5473	400
31	Suir	Golden S0138	400
Oct 7	Glenshelane	Lyre Bridge S1001	2400

Table 1 (continued)

Southwestern Region			Total : 27	stream length
May 9	Dunmanway L.	Dunmanway W2352		
27	Brown Flesk	Currow Q9704		400
27	Bandon	Ardcahan W2456		100
27	Owenakeagh	Ballinasarty W4047		2000
June 7	Bridewell	Bandon W4955		100
20	Bandon	Murragh W3855		2000
22	Brewery	Dunmanway W2352		
23	Lough Aderry	Castlemartyr W9373		
24	Lough Atarriff	Reenascreena W2455		
July 1	Rockboro	Midleton W8772		1000
7	Martin	Blarney W6077		800
8	Martin	Kilmona W5982		800
14	Cullavow	Rathmore W1620		100
14	Finnihy	Kenmare V9070		20
17	Inny	Waterville V5571		200
19	Glengarriff	Glengarriff V9257		800
19	Ilen	Skibbereen W1232		10
19	Keale	Skibbereen W1232		2000
20	Bride	Crookstown W4366		500
23	Lagoon (trib.)	Rosscarbery W2836		200
24	Laney (trib.)	Bawnmore W3476		200
27	Driminidy Lake	Derryclough W1644		
28	Rockboro	Midleton W8873		200
28	Feagle	Clonakilty W3842		3000
Aug 10	Lee	Cork city W6771		100
23	Lee	Cork city W6771		10
25	Lee	Cork city W6771		100
Shannon Region			Total : 17	
May 13	Robertstown	Shanagolden R2947		2200
16	Daar	Newcastle West R2834		
23	Deel	Newcastle West R2833		3000
24	Mountnugent	Mountnugent N4785		10000
Jun 16	Dooally	Ballyine R2436		6000
18	Allaghaun	Abbeyfeale R1227		10500
19	Shannon	Lanesboro N0071		50
19	Cloone	Aghalough H1503		200
July 4	Dungolman	Ballydoogan N1942		5000
5	Kilbride	Mountnugent N4987		5000
21	Camlin	Longford town N1275		100
25	Crover Stream	Lough Sheelin N4786		10
Aug 2	Greanagh	Milltown Bridge R4242		13000
6	Tullamore	Tullamore N3424		100
15	Camogue	Croom R5239		10000
16	Little Brosna	Mt. St. Joseph's S1190		100
Nov 15	Pound Stream	Ballyjamesduff N5291		100
Western Region			Total : 3	
May 25	Dalgan	Ballyhaunis M5079		800
Jun 19	Dunkellin	Ballymore M5120		800
19	Grange	Cloondahamper M5352		2000
Northwestern Region			Total : 4	
Jun 17	Blackwater	Glaslough H7542		
21	Rooskey	Knock M4283		100
July 1	Doonally	Doonally G7239		5000
3	Shanvaus	Shanvaus G8440		100
Northern Region			Total : 9	
May 22	Corglass Lake	Kilnaleck N4292		
June 9	Knappagh	Derrygooney		300
10	Laragh River	Cliffend H5301		2000
26	Durnesh L. (trib.)	Rossnowlagh G8869		2000
Jul 17	Lurgy	Kilmacrenan C1422		400
24	Ballymagauran L.	Newtown Gore G2312		
28	Lough Gowna	Augnaclyff N2888		
28	Lough Avaghon	Latton H6913		

Table 2. Dates of incidents and estimated numbers of fish

March		Total : 1	Number
1	Ardaghy Lake	Trout (500), stickleback (1)	500
April		Total : 3	
21	Ardaghy Lake	Trout	100
22	Grand Canal	Coarse fish	
24	Grand Canal	Coarse fish	
May		Total : 15	
1	Bridgetown	Trout, minnow	60
9	Dunmanway L.	Trout	10
13	Robertstown	Trout, eel	
16	Daar	Trout	
22	Corglass L.	Pike, roach, perch	
22	Fushogue	Trout (20), loach (1)	20
23	Deel	Trout	10
23	Triogue	Trout	100
24	Mountnugent	Trout	10000
25	Dalgan	Trout	100
27	Bandon	Trout, salmon	30
27	Bandon	Trout	20
27	Brown Flesk	Trout(400), sea trout(30), minnow(100)	500
27	Owenagearagh	Trout (300), loach (50)	350
29	Royal Canal	Pike (10), roach (300)	300
June		Total : 33	
1	Rohan's L.	Trout, bream, minnow	500
7	Bridewell	Trout, eel	100
9	Knappagh	Trout (10), pike (1)	10
10	Laragh	Trout, roach, minnow	
12	Nurney	Stickleback	
13	Blackwater	Trout, minnow	20
13	Royal Canal	Roach	50
14	Boherbawn	Trout	
14	Cushina	Trout	200
14	Mountrath	Trout	50
16	Dooally	Trout	100
16	Swan River	Eel (100), minnow (50)	150
17	Blackwater	Eel (100), minnow (50)	150
18	Allaghaun	Trout, sea trout, salmon	2000
18	Suir	Trout	
19	Cloone	Trout	15
19	Dunkellin	Trout	25
19	Glenaboy	Trout, minnow	50
19	Grange	Trout, crayfish	
19	Shannon	Coarse fish	500
20	Bandon	Trout (50),salmon(10),stickleback(100)	150
20	Derry Water	Trout	100
21	Barrow	Trout	50
21	Dee	Trout (12), salmon (3)	15
21	Owentaraglin	Trout (1500), salmon fry (500)	2000
21	Rooskey	Trout	1
22	Brewery	Trout	20
22	Grand Canal	Coarse fish	
23	L. Aderry	Rainbow trout (30), stickleback (100)	130
24	L. Atarriff	Trout (50)	50
26	Boyne	Trout	8
26	Durnesh L.	Trout, eel, stickleback	
28	Martry	Trout	40

Table 2 (continued)

July		Total : 48	
1	Doonally	Trout, sea trout, bream	1000
1	Rockboro	Trout, eel	300
1	Yellow	Trout	12
2	Newtown	Trout	40
3	Shanvaus	Trout	140
4	Dungolman	Trout (35), Coarse fish (65)	110
4	Tyholland	Pike	12
5	Broadmeadow	Minnow, eel	20
5	Kilbride	Trout (150), stickleback	150
6	Acore	Trout	1000
7	Mountain	Trout, eel, minnow	30
7	Martin	Trout	300
8	Martin	Trout	50
9	Anner	Trout, salmon, loach	50
9	Rye	Trout	60
12	Clodiagh	Trout, loach	
13	Cullavaw	Trout (10), minnow (100)	100
14	Finnihy	Minnow	10
16	Blackwater	Trout	40
16	Clashawley	Trout	60
17	Inny	Salmon	50
17	Lurgy	Trout, salmon	20
17	Moynalty	Trout	14
18	Clonmore	Trout, eel, loach, stickleback	500
19	Glengarriff	Salmon	20
19	Derreen	Trout	15
19	Ilen	Salmon	3
19	Keale	Trout, eel	50
19	Suir	Trout (500), salmon (4)	500
20	Bride	Trout (200), salmon (40), eel, s'back	250
20	Castletown	Trout (400), salmon (6)	400
21	Acore	Trout	800
24	Barrow	Trout	10
21	Camlin	Coarse fish	50
23	Dee	Minnow	50
23	Rosscarbery	Trout, mullet	10
24	B'magauran	Bream	100
24	Laney	Trout	30
25	Blackwater	Trout, minnow	5000
25	Crover	Trout	30
26	Dinin	Trout	100
27	Driminidy	Trout, rainbow trout	20
28	Feagle	Trout, sea trout	200
28	L. Avaghon	Pike (3), perch (100)	100
28	L. Gowna	Roach (100), trout (2)	100
28	Rockboro	Sea trout	30
30	Barora	Trout (8), minnow (500)	500
31	Suir	Trout (500), salmon (4)	500
August		Total : 9	
2	Greanagh	Trout, salmon, eel	500
6	Tullamore	Trout, salmon	300
10	Lee	Trout	20
11	Proules	Trout, eel	10
15	Camogue	Trout, salmon	100
16	Little Brosna	Trout (24)	25
23	Lee	Salmon	2
25	Derreen	Trout	15
25	Lee	Trout	20
October		Total : 1	
7	Glenshelane	Trout, salmon, eel	1500
November		Total : 1	
15	Pound	Trout (75)	75

Table 3. Causes of fish kills. Confirmed cases indicated by *

AGRICULTURAL Silage: 10, Slurry: 8, Unspecified: 7, Spray: 1

Eastern	May	1	Bridgetown (trib.)	Slurry
	Jun	21	Dee	Unspecified
		28	Martry	Silage
Southern	Aug	25	Derreen (trib.)	Unspecified
	Apr	22	Grand Canal	Slurry
	Jun	12	Nurney	Silage
		14	Boherbawn	Unspecified
		14	Cushina	Silage
		21	Owentaraglin	Unspecified
	Jul	6	Acore	Slurry
S-Western		16	Clonmore/Suir	Unspecified
		21	Acore	Slurry
	May	27	Owenakeagh	Silage
	Jul	20	Bride	Crop spraying
Shannon		28	Feagle	Slurry
	May	13	Robertstown	Unspecified
		16	Daar	Silage
		24	Mountnugent	Pig slurry
	Jun	16	Dooally	Silage
		18	Allaghaun	Silage
	Jul	4	Dungolman	Silage
		5	Kilbride	Cattle slurry
	Aug	2	Greanagh	Unspecified
		15	Camogue	Slurry
N-Western	Jul	1	Doonally	Silage
Northern	Jun	26	Durnesh L. (trib.)	Silage

DEOXYGENATION Total: 25

Eastern	Jun	17	Blackwater
		26	Boyne
	Jul	5	Broadmeadow
		7	Mountain Water
		17	Moynalty R.
		20	Castletown
Southern		23	Dee (trib.)
	May	23	Trilogue
	Jun	21	Barrow
	Jul	16	Clashawley
		21	Barrow
S-Western	May	27	Bandon
	Jun	24	Lough Atarriff
	Jul	19	Glengarriff
		19	Ilen
Shannon	May	23	Deel
	Jun	17	Grand Canal
		19	Cloone
	Jul	21	Camlin
		25	Crover Stream
Western	Jun	19	Dunkellin
		19	Grange
N-Western	Jun	17	Blackwater
		21	Rooskey
	Jul	3	Shanvaus

INDUSTRIAL Factory: 8, Creamery: 3, Abbatoir: 2, Hot water: 1

Eastern	Jun	13	Blackwater	Abbatoir effluent	
		16	Swan River	Detergent from factory	*
	Jul	19	Derreen	Factory effluent	*
		30	Barora	Factory effluent	*
Southern	Jun	19	Glenaboy	Factory effluent	
	Jul	9	Anner	Factory effluent	
		26	Dinin (Trib.)	Diesel oil from factory	*
S-Western	May	27	Brown Flesk	Creamery effluent	
	Jul	1	Rockboro	Ammonia from factory	*
		8	Martin	Cheese factory effluent	*
		14	Cullavaw	Creamery effluent	
		14	Finnihy	Creamery effluent	
Shannon	Jun	19	Shannon	Cooling water	
	Nov	15	Pound Stream	Abbatoir effluent	*

Table 3 (continued)

ENRICHMENT		Total: 12	
Eastern	Jul 9	Rye	*
S-Western	May 9	Dunmanway L.	*
	Jun 23	Lough Aderry	
	Jul 27	Driminidy Lake	
	Aug 10	Lee	*
	Aug 23	Lee	*
	Aug 25	Lee	*
Northern	May 22	Corglass Lake	*
	Jun 9	Knappagh	*
	Jul 24	Ballymagauran L.	
	Jul 28	Lough Gowna	
	Jul 28	Lough Avaghon	
CIVIL WORKS		Roads: 4, rivers: 4, building: 2, sw. pool: 1	
Eastern	May 29	Royal Canal	Level lowered for roadworks *
	Jun 1	Rohans L.(trib)	Liquid concrete spillage *
	Jun 13	Royal Canal	Level lowered for roadworks *
	Jun 20	Derry Water	Silt from drainage *
Southern	Apr 24	Grand Canal	Lowered water level *
	Jul 31	Suir	Silt from river workings *
	Oct 7	Glenshelane	Cement from building site *
S-Western	Jun 7	Bridewell	Cement from roadworks *
	Jun 22	Brewery	Chlorine from swimming pool
	Jul 7	Martin	Cement from roadworks *
	Jul 17	Inny	Silt from river workings *
Western	May 25	Dalغان	Chlorine from swimming pool *
SEWAGE		Total: 9	
Eastern	Jul 4	Tyolland	
	Jul 16	Blackwater	
	Aug 11	Proules	*
Southern	Jul 19	Suir	
	Jul 19	Keale	*
	Jul 28	Rockboro	*
Shannon	Aug 16	Little Brosna	*
Northern	Jul 17	Lurgy	*
WATERWORKS		Wash down: 4	
Southern	May 22	Fushoge	*
	Jun 14	Mountrath (Trib.)	*
	Jul 12	Clodiagh	*
Northern	Jun 10	Laragh River	*
UNKNOWN		Total: 10	
Eastern	Mar 1	Ardaghy Lake	
	Apr 21	Ardaghy Lake	
	Jul 1	Yellow River	
	Jul 2	Newtown	
	Jul 25	Blackwater	
Southern	Jun 22	Grand Canal	
S-Western	Jun 20	Bandon	
	Jul 23	Rosscarbery	
	Jul 24	Laney (trib.)	
Shannon	Aug 6	Tullamore	

Table 4. Causes of fish kills 1988 and 1989

Agricultural includes:

1989 Silage (10), Slurry (7), Crop spray (1), Unspecified (7)

1988 Silage (13), Slurry (7), Crop spray (1), Unspecified (4)

Civil Works includes:

1989 Building (2), Rivers (4), Roads (4), Swimming Pool (2)

1988 Building (1), Rivers (3)

Region	E	S	SW	Sh	W	NW	N	Total
1989								
Agricultural	4	8	3	9		1	1	26
Deoxygenation	7	4	4	5	2	3		25
Industrial	4	3	5	2				14
Enrichment	1		6				5	12
Civil Works	4	3	4		1			12
Sewage	3	1	2	1			1	8
Unknown	5	1	3	1				10
Waterworks		3					1	4
Total for 1989	28	23	27	18	3	4	8	111
1988								
Agricultural	6	5	3	7		3	1	25
Deoxygenation								0
Industrial	2	3		1			1	7
Enrichment			1	2			1	4
Civil Works	1	1	1					3
Sewage								0
Unknown	2		1	2		1	1	7
Waterworks	1			2				3
								0
Total for 1988	12	9	6	14	0	4	4	49

Fig. 1

Frequency of fish kills at bimonthly intervals

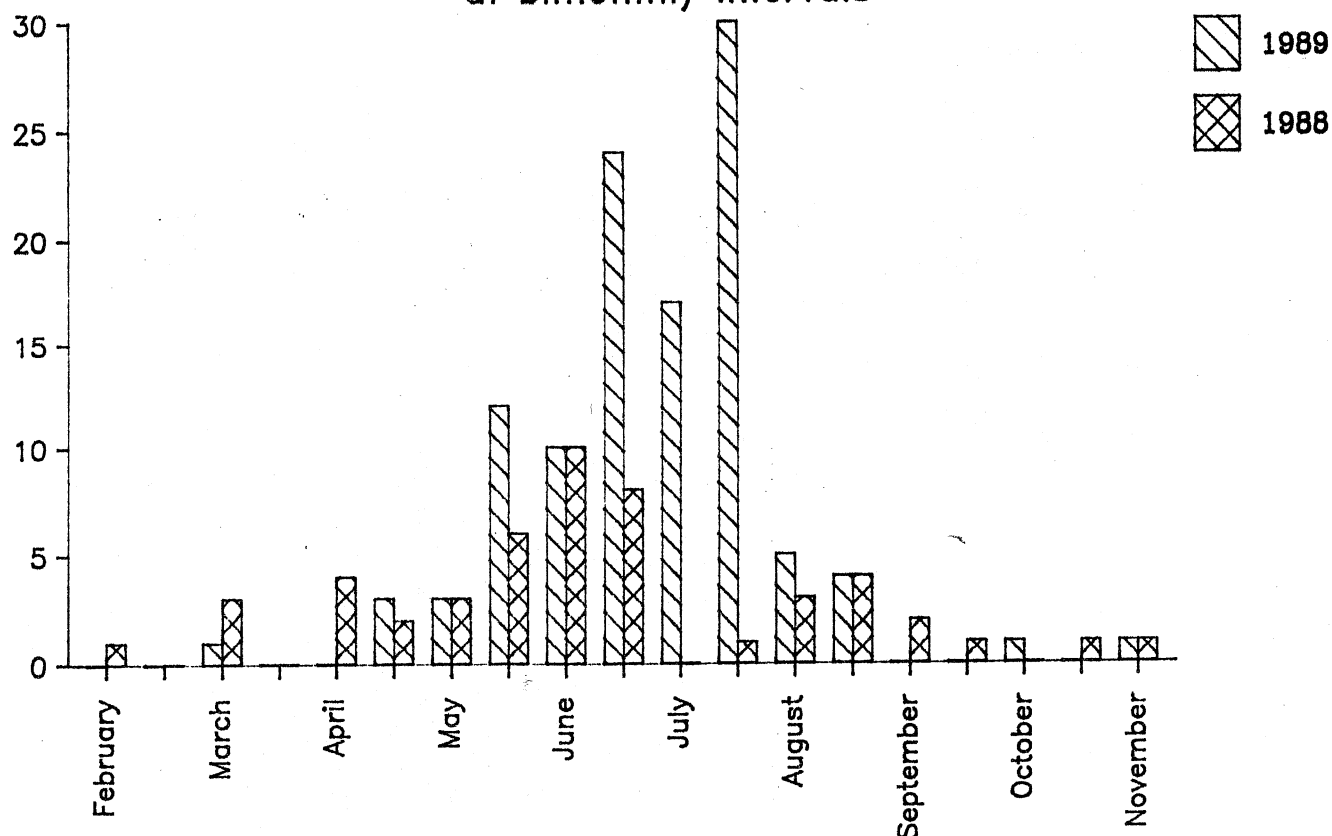


Fig. 2

Monthly rainfall at Birr for 1989 and average for 1951-80

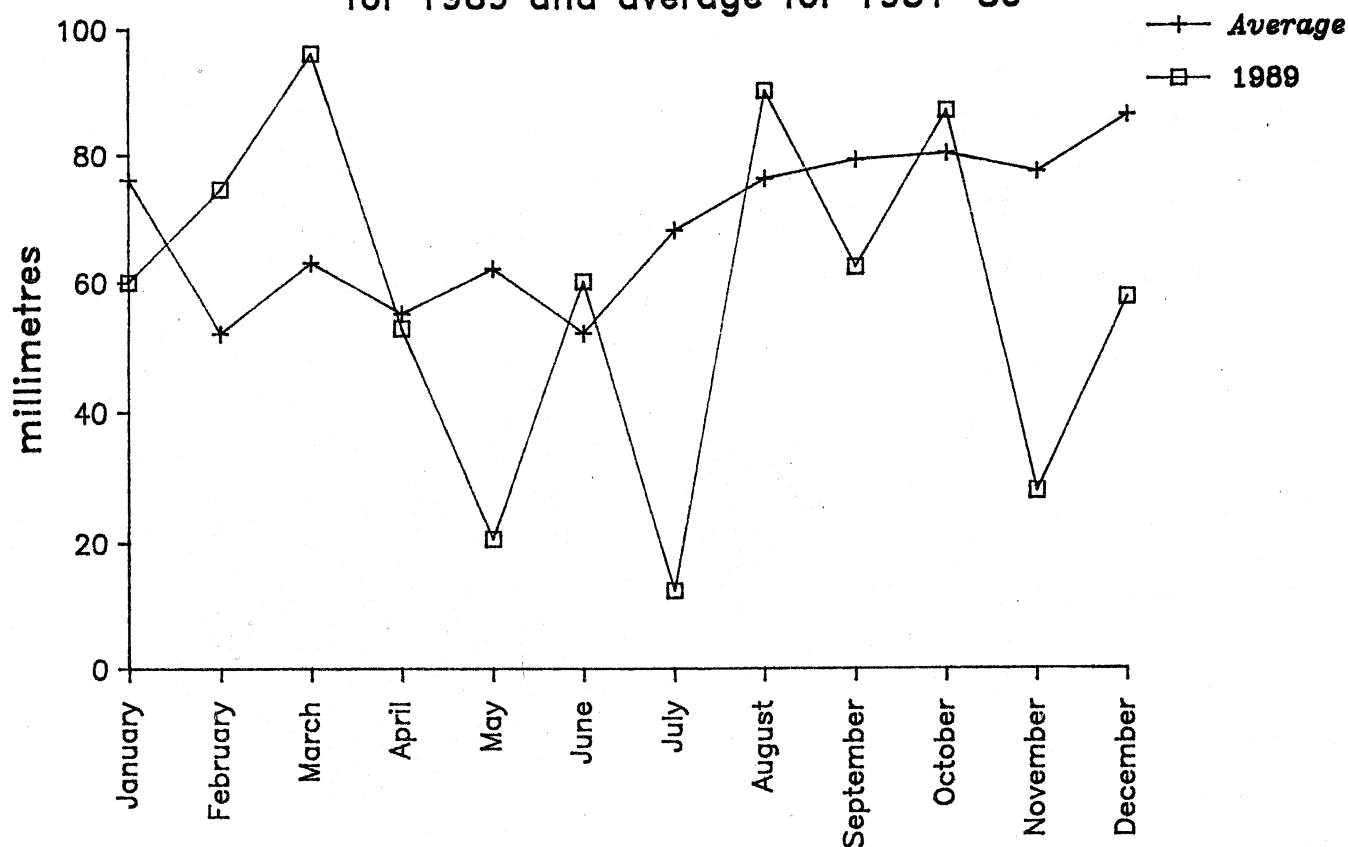
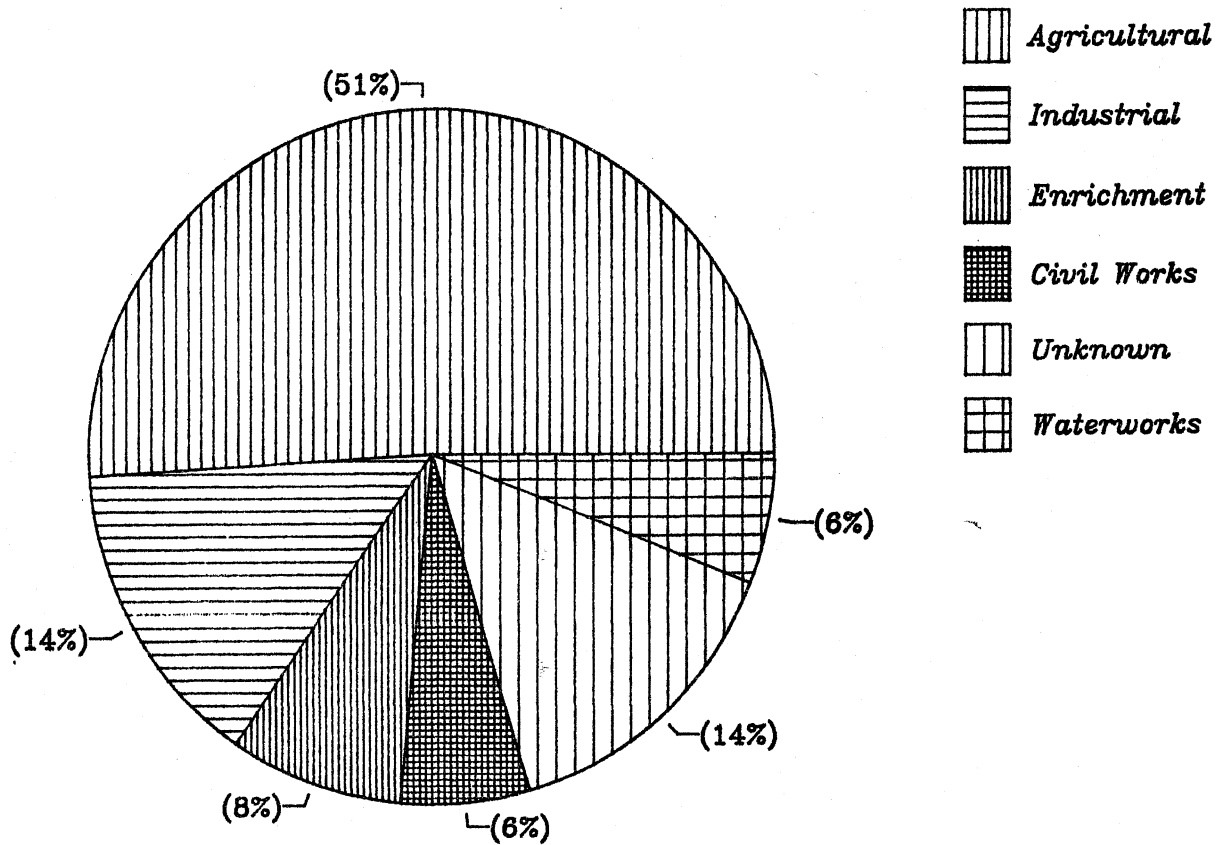


Fig. 3

Causes of fish kills 1988



Causes of fish kills 1989

