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**ROINN NA MARA**

**FISH KILLS 1969-1987**

**by**

**Desmond T. McCarthy**

**FISHERY LEAFLET 141**

**1988**



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A total of 66 fish kills were reported to the Regional Fisheries Boards in 1986 and 122 in 1987. Effluents from agriculture and agriculture-based industries accounted for 56 of the kills in 1986 and 95 in 1987.

When the two periods, 1969-74 and 1980-87 are compared, it can be seen that the numbers caused by sewage and industrial wastes have not changed significantly, but the damage from agriculture has risen at an alarming rate.

The fact that problems from sewage and industry remained at a low level in the period, in spite of increasing urbanisation, suggests that measures to combat these sources of pollution have had some effect. Analysis of the fish kills shows clearly that the most urgent problem is to discover how silage effluent can be controlled.

In the report "Water Quality in Ireland", Paul Toner and his co-authors state that "the majority of waters surveyed compares very favourably with that in other EEC countries" and points to "a significant reduction of the incidence of serious pollution in rivers over the past fifteen years". However, the report goes on to add that there has been a fourfold increase in the length of river channel "slightly polluted" and a smaller increase in the length of moderately polluted channel.

An analysis of documented fish kills in Irish open waters in the past eighteen years demonstrates that, although the incidence of acute pollution from point sources (sewage and factory effluent) is stable, fish kills resulting from agricultural pollution from non-point sources increased rapidly and were responsible for 59 per cent of cases in 1986 and 70 per cent in 1987. This Leaflet presents details of the fish kills in 1986 and 1987 together with data from earlier years and demonstrates how the nature of the problem has changed.

#### Fish Kills in 1986 and 1987

Sixty-five fish kills were documented by the Regional Fisheries Boards in 1986 (Appendix 1, Figure 1) and 122 in 1987 (Appendix 2). The highest incidence was in May, June and July as reported in previous years by Edward Fahy (Fishery Leaflets 128 and 132). This, however, cannot be attributed solely to low rainfall in this period but rather to intensive agricultural activity, primarily silage making, in June.

In 1986, 24 per cent of all fish kills were attributed directly or indirectly to silage effluent and a further 12 per cent to the cumulative synergetic effects of silage and farm effluents. In 1987 the figures were 42 per cent and 30 per cent respectively.

Non-point sources of pollution accounted for 77 fish kills, 60 per cent of the total.

The worst affected river in the country was the Feale. A total of 21 fish kills were reported, all of them downstream of a milk processing plant.

## Fish Kills in 1969-1974

Confirmed fish kills in the 1969-1974 period (Appendix 3) averaged 22 per year. Point sources, sewage and industries, accounted for 50 per cent and 39 per cent were due to agricultural processing. Non-point sources were responsible for only 11 per cent of fish kills in the period.

## Discussion

The analysis of fish kills in the 1969-1974 and 1980-1987 periods is shown in Figure 2 for the three main categories of pollution in Ireland: Agricultural, Industrial, Sewage, the latter including dump leachates. This shows a significant increase in the number of fish kills through a period of increased agricultural activity and of legislative change, namely the Local Government (Water Pollution) Act 1977.

Fish kills from agricultural non-point sources increased in the eighties by 500 per cent and these are now the most important cause of pollution in open waters in Ireland. The discharge of agricultural effluents into waters may be an offence under Section 3 (1) of the 1977 Act, but unless the effluent enters water or a sewer by way of any works apparatus, plant or drainage pipe, the discharges are not licensible under Sections 4 and 16 of the Act.

The Act, in effect does not offer adequate means to deal with non-point sources of agricultural pollution from fertiliser run-off, herbicides, insecticides and silage effluent.

The report on "Water Quality in Ireland, the Current Position" (An Foras Forbartha 1986) emphasises the improvement in water quality in Ireland since 1971.

It particularly notes the significant reduction of the incidence of serious chronic pollution in rivers and streams. The upgrading of waste treatment in the large towns has been a major factor in this.

Because non-point-source pollution impacts are not site- and source-specific and are difficult to identify and quantify, assessments of the severity of the problems vary. Some experts declare non-point sources to be the major reason for failure to reach water quality goals in the USA and Europe. From the analysis of data presented in this report, it would

appear that our inland waters are at a pivotal point in relation to water quality. Our fisheries therefore require non-point-source pollution management control programmes as a matter of urgency.

#### Acknowledgements

I would like to express thanks to the Inspectorate of the former Boards of Conservators for their painstaking work in the past in protecting our rivers and lakes and to Con Flynn, State Chemist for analysing effluents in the 1969-1974 period. I would also like to thank the Regional Pollution Officers for providing the data, and Eileen Twomey and Christopher Moriarty for their critical reading of the manuscript.

Appendix 1

Fish kills reported by Regional Fisheries Boards 1986  
(unconfirmed causes indicated by asterisk\*)

<u>Fisheries Regions</u>	<u>Date</u>	<u>O.S. Grid Reference</u>	<u>Species</u>	<u>Pollutant</u>
<u>Eastern</u>				
Milltown Fane	28 June	H85 22	Brown trout	Silage effluent and slurry
Bellanode L.	19 August	H63 35	-	Silage effluent and Slurry
Flurry	20 October	J09 12	-	Meat processing effluent
Mountnugent	19 June	N53 92	Brown trout	Silage effluent
Lear	12 Sept	N68 99	Bream, brown trout	Sewage effluent
Rogerstown R	11 July	010 27	Brown trout	Farm effluent
Dodder R	29 July	012 28	Brown trout	Silt
Chapel R	21 July	029 04	Sea trout	Pesticide
Owenavorrhagh	21 June	T14 53	Sea trout	Silage
	29 June	T14 53	Sea trout	Silage
Sow R	29 June	T 3 32	N/A	-
<u>Southern</u>				
Cully R	17 June	S33 84	Minnows	Silage
Barrow Canal	26 June	S68 94	Coarse fish	-
Moneen R	28 July	S69 96	Brown trout	Farm effluent
Ara R	22 May	R89 35	Brown trout	Creamery "
Clodiagh R	20 July	S45 15	"	Farm "
Suir R	24 July	S13 63	"	-
Corock R	28 July	S86 15	"	Farm "
<u>Southwestern</u>				
Rostellan L	3 March	W88 66	Mullet	-
Bride R	11 June	W43 66	Salmon, Brown trout, Eels	Industrial effluent
Owenaboy R	16 June	W63 62	Brown trout	Silage effluent
Lee R.	22 June	R89 15	Eels Brown trout	"

Appendix 1 (continued)

<u>Fisheries Regions</u>	<u>Date</u>	<u>O.S. Grid Reference</u>	<u>Species</u>	<u>Pollutant</u>
<u>Shannon</u>				
Feale R	7 June	Q99 33 to Q96 32	Salmon	Creamery* effluent
Feale	19 June	"	Salmon	"*
"	24 June	"	Sea trout	"*
"	25 June	"	Salmon	"
"	26 June	"	"	"
"	27 June	"	"	"
"	28 June	"	"	"
"	29 June	"	Salmon, Sea trout	"
"	3 July	"	Salmon	"
"	20 July	"	"	"
"	21 July	"	"	"
"	2 October	"	"	"
"	10 October	"	"	"
"	17 October	"	"	"
"	18 October	"	"	"
Galey	11 June	Q94 33	Brown trout	Piggery and Dairy effluent*
Cashen	17 June	Q89 36	-	"
"	2 Sept	-	-	"
Cashen	12 October	Q89 34	Salmon	Piggery effluents*
Deel	14 June	R31 31	Brown trout	Diesel oil
"	15 June	R27 37 to R31 24	" "	Silage/Farm effluents*
"	21 June	R32 31 to R31 24	" "	"
"	25 June	R40 24	-	Farm effluent
Ara	24 June	Q35 50	Brown trout	Silage "**
Deel	30 June	Q35 50	"	Cumulative Syngernetic
Maigue	3 June	R52 38	Brown trout, Salmon	-
White Kilcrow	23 June 15 July	R19 46 M69 17	Brown trout "	Farm effluent Dairy farm effluent*
<u>Western</u>				
Dalغان	26 June	M43 64	Salmon, Brown trout	Meat Processing effluent*
Currafere	23 April	G89 39	Brown trout	Chemical spillage

Appendix 1 (continued)

<u>Fisheries Regions</u>	<u>Date</u>	<u>O.S. Grid Reference</u>	<u>Species</u>	<u>Pollutant</u>
<u>Northern</u>				
Dromore	16 June	H71 21	Coarse fish	Farm effluent
Laragh	16 June	H51 05*	Coarse fish	Silage " *
Cavan Town	20 June	H42 04	Brown trout, coarse	Silage "**
Loughbourn	24 June	N30 88	Brown trout	Silage effluent
Bunoe	26 June	H51 13	Brown trout	"
"	26 June	H58 19	Roach	"*
Ballintra	28 June	H73 20	Roach	"*
	2 July	H61 12	Brown trout, Roach	"*
Finn trib	5 July	H50 23	"	"*
L Mayor	7 July	H73 20	Pike	Silage effluent
L. Sillan	1 August	H72 06	Coarse fish	-
L. Sillan	9 August	H72 06	"	Eutrophication
Keenagh Burn	2 July	C23 12	Brown trout	Farm slurry
(Swilly)	10 Sept	C23 12	Salmon	Silage effluent



Appendix 2

Fish Kills Reported by Regional Fisheries Boards in 1987  
( unconfirmed causes indicated by asterisk\*)

Eastern Region	Dates	O.S Grid.	Species	Pollutant
Proules R.	February 15	E82.06	Trout	Pig Slurry
Togher R.	May 26	N12.89	Eels	Silage-Slu
Cormey R.	May 31	N79.95	Trout	Indus.Eff.
Killary Waters	June 22	N88.83	Trout	Silage
County Water	June 24	H89.24	Trout	Silage
Castlemaine R.	July 23	H74.32	Trout	Silage
Glyde R.	August 6	O 5.95	Salmon	-
Little Boyne R.	June 6	N60.45	Trout	Agric.Eff.
Mountnugent R.	June 18	N53.92	-	-
Nanny R.	June 27	O 9.70	Salmon/Tr.	Agric.Eff.
Blackwater R.	July 6	N81.69	Minnow	Agric.Eff.
Hurley R.	July 30	N98.69	Salmon	Agric.Eff.
Camlin R.	August 5	N14.75	Trout	Sewage.*
Trimblestown R.	July 10	N73.61	Salmon/Tr.	Agric.Eff.
Termofeckin R.	August 11	O14.81	Trout	Agric.Eff.
Nanny R.	August 20	O 5.68	Salmon	-
Grand Canal	May 18	O17.33	Roach	Sewage
Tolka R.	May 27	O 8.38	Trout	-
Slaney R.	June 2	S88.83	Salmon fry	Silage
Aughrim R.	June 3	T03.73	<100Trout	Agric.Eff.
Owenvarragh R.	June 7	T19.56	Trout	Silage
Ballyboghil R.	August 2	O15.52	Trout	Silage
Southern Region				
Ara R.	May 7	R89.35	Trout	Creamery E
Duiske R.	May 9	S71.44	Trout	Indus.Eff.
Owenass R.	May 22	N43.06	Trout	Silage
Munster R.	May 31	S89.52	Trout	Silage
Ara R.	June 2	R89.35	Trout	Agric.Eff.
Pill R.	June 3	S46.22	Trout	Silage
Kings R.	June 5	S46.39	Trout	Silage
Triogue R	June 6	N15.48	Trout	Agric.Eff.
Owenduff R.	June 8	S77.25	Trout	Silage
Anner R.	June 7	S33.37	Trout	Silage
Breagagh R.	June 8	S50.56	Trout	Agric.
Clonmore R.	June 9	S15.73	Trout	Silage
Kilbraghan R.	June 11	S36.49	Trout	Silage
Suir R.	June 11	S13.58	Trout.Perch	
Stradbally R.	June 18	S55.91	Trout	Silage
Kings R.	June 24	S30.45	Trout	Silage

Appendix 2 (Continued)

Southern Region (cont.)

Greese R.	July 3	S79.94	-	Agric.Eff.
Arrigle R.	July 5	S55.35	Trout	-
Fushoge R.	July 9	S68.76	Trout-	Silage
Multeen R.	July 11	R92.52	Trout	Agric.Eff.
Pococke R.	July 13	S53.58	Trout	Silage*
Burren R.	July 16	S80.79	Trout	Silage
Multeen R.	July 29	R97.44	Trout	Agric.Eff.
Kings R.	July 31	S30.45	Trout	Agric.Eff.
Barrow R.	August 2	N38.14	Trout	Pig Slurry
Gaul R.	August 5	S28.63	Trout	-
Cromoge R.	August 10	S04.62	Trout	-
Erkina R.	August 20	S82.25	Trout	Silage
Brogeen R.	June 1	R28.04	Trout	Silage

Anbel R.	June 4	R54.09	Trout	Sewage
Gradogue R.	June 5	R82.13	-	Agric.Eff.
Gradogue R.	June 9	R82.13	Salmon/Tr.	Agric.Eff.
Ballinkenny R.	June 10	R79.03	Trout	Silage
Dallua R.	June 25	R34.04	Trout	Silage
Araglin R.	June 30	R20.05	Trout	Silage
Blackwater R.	August 13	W82.99	Trout-	Indus.Eff.
Blackwater R.	August 17	R82.13	Trout-	Pig Slurry

South Western Region

Glashgarriff R.	June 3	W44.76.	Trout	-
Owbeg	June 4	W00.74	Salmon	Pig Slurry
Aughnaboy	June 4	W55.61	Trout	-
Martin R.	June 23	W59.85	Trout	Pig Slurry
Owenagearagh R.	July 12	W54.76	Trout	Agric.Eff.
Garrydubh R.	July 14	W72.62	Sea Trout	Silage
Masseytown R.	July 16	W33.76	Trout	Silage
Owenabue R.	July 18	W62.62	Sea Trout	Ind.Eff.
Coomhola R.	July 29	V99.55	Salmon	Cu.So4
Casherode R.	July 31	W32.77	Trout	Agric.Eff.
Bandon R.	August	W35.54	Salmon	-

## Shannon Region

Maigue R.	April 29	-	Trout	Agric.Eff.
Feale R.	May 7	Q90.33	Trout	Creamery.*
Feale R.	May 8	Q90.33	Salmon	Creamery *
Finglasha R.	May 25	R39.27	Trout	Silage
Bunoke R.	May 27	R32.24-28	Trout	Manure
Deel R.	May 31	R41.21	Trout	Silage
Ballintubber R.	June 1	-	Trout	Agric.Eff.
Morningstar R.	June 4	R56.34	Trout	-
Maigue R.	June 5	R53.38	Trout	Silage
Feale R.	June 5	Q94.31	Flat Fish	Agric.Eff.
Brosna L.	June 22	S08.86	Trout	Silage
Trough R.	June 19	R55.65	Trout	Silage
Deel R.	June 19	R29.32	Trout	Low BOD.
Maigue R.	June 20	R55.30	Trout	Silage
Grand Canal	June 20	N45.28	Coarse Fish	Washout
Maigue R.	June 24	R53.27	Trout/c.f	Silage
Loobagh R.	July 5	R62.27	Trout	Indus.Eff.
Carrig R.	July 14	N01.01	Trout	Agric.Eff.
Inny R.	July 28	N16.55	Salmon	Indus.Eff.
Ballyharda R.	July 28	M76.30	Trout	Creamery W
Camlin R.	August 5	N14.75	Trout	Sewage
Ballyharda R.	August 15	M80.32	Salmon	Creamery W
Liskenny R.	August 18	R49.76	Trout	Agric. Eff
Tullamore R.	August 22	N34.25	Trout	Sewage
Gallagh Lake	August 25	N15.90	Bream	Eff.*
White R.	August 15	R17.41	Salmon	Agric. Eff
White R.	Sept.1	R19.46	Trout	Agric.Eff.

## Western Region

Robe R.	June 30	M37.69	Trout	Silage
Loughrea Trib.	July 11	M62.17	Trout	Silt
Carrowkeel R.	July 22	M52.61	Trout	Silage
Clooneen R.	Sept.11	M28.47	Trout	Waterworks

## North Western Region

Glore R.	June 9	M35.93	Salmon	Sewage
Longhymeenaghan	LJuly 13	G15.74	Coarse F.	-

## Northern Region

Termon R.	January 30	H19.74	Trout	Slurry
Stragar R.	Febuary 20	G73.80	-	Fish Eff.
Finn R.	May 20	H50.25	Trout	Silage
Bunduff R.	May 21	G78.53	Salmon	Poison
Lennon R.	May 30	C14.20	Salmon	Pig Slurry
Braskey R.	June 3	N48.98	Trout/Roach	Silage
Finn R.	June 8	H52.30	Trout/Roach	-
Finn R.	June 25	H52.30	Trout	Silage
Annalee R.	June 23	H62.04	Trout	Silage
Braskey R.	June 26	N48.98	Trout	Silage
Kill Lake	June 26	N42.91	Perch	Silage
Finn R.	June 27	H48.22	CoarseFish	Silage
Lough Major	June 30	H73.20	Trout	Silage
Derryvalley R.	June 30	H70.22	Trout	Silage
Lough Mourne	July 1	-	Trout	Silage
L.Garadice Trib.	July 3	H18.11	Trout	Silage
Ballinage R.	July 7	-	Trout	Silage
Erne R.	July 20	H35.05	Coarse F.	Silage
Laragh R.	July 30	H51.05	Trout/Cse.	Poultry Ef

Appendix 3. Fish kills reported by Boards of Conservators Inspectorate (1969-1974).

<u>Fishery District</u>	<u>Dates</u>	<u>O.S.Grid Reference</u>	<u>Species</u>	<u>Pollutant</u>
<u>Dublin</u>				
Dodder	October 1969	015 26	Brown trout	Sewage
	July 1970	017 30	"	Detergent
	August 1970	015 29	"	Sewage
	March 1973	015 29	"	Sewage
	August 1973	015 29	"	Sewage
	March 1975	015 29	"	Chemical waste
	May 1975	015 29	"	Dump leachate
Rye	July 1969	N88 40	"	Sewage
	October 1969	N94 37	"	Farm effluent
	August 1972	N94 37	"	Herbicide
Liffey	August 1969	0 8 38	"	Sewage
	May 1972	0 3 35	"	Sewage
	Sept 1974	N88 25	Brown trout/ Salmon	Sewage
Broad-meadow	June 1971	0 6 52	Brown trout	Silage effluent
	August 1971	012 50	"	Pesticide/herbicide
	Nov 1971	016 45	"	"
Tolka	June 1971	0 8 38	"	Silage effluent
	June 1973	0 8 38	"	Oil hydrocarbon
	July 1973	016 36	"	Oil hydrocarbon
Grand Canal	July 1972	N89 19	Coarse fish	Silage effluent
Potters	June 1971	T30 85	Brown trout	Chicken slurry Silage effluent
Slaney	1972	T 1 23	Eels	Silage effluent
<u>Waterford</u>				
Owerness and Triogue	1969-1974 every year	N45 05	Brown trout	Sewage
Barrow	1969-1974 every year	S72 72	"	Sugar beet effluent
Nore	April 1974	S41 84	"	Sewage
Kilmanagh	August 1969	S15 19	"	Chemical spillage

Appendix 3 cont.

<u>Fishery District</u>	<u>Dates</u>	<u>O.S.Grid Reference</u>	<u>Species</u>	<u>Pollutant</u>
<u>Waterford</u> (continued)				
Tonoque	June 1970	S15 26	"	Chemical spray
Ara	April 1971	R94 32	"	Creamery effluent, sewage
	July 1972	R95 32	"	" "
	April 1973	R90 36	"	" "
Rockwell	October 1972	S08 33	"	Farm effluent
Mahon	June 1974	S40 50	"	Dump leacate
Suir	July 1971	S09 55	Brown trout/ Salmon/Eels	Piggery effluent
	Sept 1971	S09 55	Brown trout/ Salmon/Eels	Sugar beet effluent
	July 1972	S09 55	Brown trout/ Salmon/Eels	"
<u>Lismore</u>				
Cullaway	May 1971	W17 93	Brown trout	-
Dalva	July 1973	R38 01	Salmon/Brown trout/Coarse fish	Creamery effluent
Allow	July 1973	R39 01	Salmon/Brown trout/Coarse fish	Creamery effluent
Funchion	August 1973	R72 08	Salmon/Brown trout/Coarse fish	Creamery effluent
Blackwater	October 1969	W58 98	Salmon/Coarse fish	Sugar Beet effluent
	October 1969	W65 98	Salmon/Coarse fish	" "

Appendix 3 cont.

<u>Fishery District</u>	<u>Dates</u>	<u>O.S. Grid Reference</u>	<u>Species</u>	<u>Pollutant</u>
<u>Cork</u>				
Martin	1969-1970	W61 76	Salmon/Brown trout	Creamery effluent
Bride	1972	W50 68	Brown trout	-
Knockraha	1974	W73 74	Salmon/Brown trout	-
Curraheen	1972	W65 72	Brown Trout	-
Owencurra	July 1970	W88 72	Sea trout/Brown trout	-
Bandon	July 1974	W35 53	Salmon/Brown trout/eels	Creamery effluent
Clonakilty	Aug 1973	W39 42	Sea trout/Brown trout	-
Glen	May 1974	W13 41	Sea trout/Brown trout	Herbicide
<u>Kerry</u>				
Maine	1969	Q88 02	Salmon/Sea trout	Creamery effluent
Roughy	1970	V98 73	Salmon/Sea trout	Piggery effluent
Owenascaul	1975	Q59 02	Brown trout	" "

Appendix 3 cont.

<u>Fishery District</u>	<u>Dates</u>	<u>O.S.Grid Reference</u>	<u>Species</u>	<u>Pollutant</u>
<u>Limerick</u>				
Feale	1973	Q99 33	Salmon/ Sea trout	Creamery effluent
Scarriff	1971	R64 84	Brown trout	Industrial spillage
Mulcair	1973	R70 52	Brown trout	Creamery effluent
Nenagh	1969-1974 every year	R88 80	All species	Sewage effluent, Industrial effluent
Moneen	1969-1974 every year	S13 90	All species	Sewage, Industrial effluent
Tullamore	1969-1974 every year	N32 25	All species	Industrial Effluent
Ballyfinboy	1972	R90 93	Brown trout	Creamery, Sewage effluent
Kilcomen	1973	M72 14	Brown trout	Mining effluent
Lough Sheelin	1972	N42 84	Brown trout	Eutrophication
Bunowen	1973	L80 81	Salmon	Sewage effluent
<u>Galway</u>				
Clare	Sept 1971	M43 52	All species	Sugar Beet effluent
Glensaul	August 1973	M10 68	Brown trout	Industrial Spillage
Robe	April 1974	M10 63	Brown trout	Hydrocarbon Oil

Appendix 3 cont.

<u>Fishery District</u>	<u>Dates</u>	<u>O.S.Grid Reference</u>	<u>Species</u>	<u>Pollutant</u>
<u>Ballina</u>				
Palmerstown	1969-1974	G17 31	All species	Malicious
<u>Ballyshannon</u>				
Cavan	Oct 1972	H40 08	All species	Sewage effluent
Erne	1969	G88 62	Salmon	Sewage effluent
	1970	G88 61	Salmon	Chicken slurry
	1973	H35 02	Bream and Coarse fish	" "
Hollybank Lake	1970-72	N26 98	Coarse fish	Sewage effluent
Garadice Lake	1969	H18 11	Coarse fish	Farm effluent
Gangin Lake	1969	H23 03	" "	" "
Town Lake Killeshandra	Sept. 1972	H31 07	" "	Sewage, Creamer effluent
Lough Gowna	1972	N30 90	" "	Farm effluent
<u>Letterkenny</u>				
Donagh	1969-1974	C47 46	Salmon, Brown trout	Alcohol factory effluent
Cranna	Sept 1972	C38 34	Salmon	Chemical spillage



<u>Fishery District</u>	<u>Dates</u>	<u>O.S. Grid Reference</u>	<u>Species</u>	<u>Pollutant</u>
<u>Dundalk</u>				
Blackwater	July 1969	H74 40	Brown trout	Sewage industrial
	July 1971	H74 40	Brown trout	" "
	July 1973	H74 40	" "	" "
Proules & Naglack	June 1970	H84 03	Rainbow trout	Sewage/Factory
	June 1971	H84 03	Coarse fish	" "
	June 1973	H84 03	" "	" "
	June 1974	H84 03	" "	" "
Lisiniske L	May 1971	H85 03	Bream	Sewage effluent
Naglack	Aug 1971	H85 02	Coarse fish	Sewage industrial effluent
White	July 1969	006 87	Brown trout	Heavy metal
<u>Drogheda</u>				
Kinnegad	July 1969	N60 45	Brown trout	Meat processing effluent
	April 1974	N60 45	" "	" "
Castle Lake	July 1970	N67 99	Bream/coarse fish	Creamery effluent
	Oct 1971	N67 99	" " "	" "
	Aug 1972	N67 99	" " "	" "
Trimblestown	July 1970	N72 63	Brown trout	Silage effluent
Ramor	Sept 1971	N60 68	Pike, Bream, Brown trout	-
Kells Blackwater	Aug 1972	N73 77	Brown trout	-
	April 1973	N87 68	" "	-
Little Boyne	Oct 1972	N63 33	" ", Pike	-
Moynalty	June 1973	N74 82	Salmon, Brown trout	Industrial effluent
Wilkinstown	July 1971	N86 77	Brown trout	Silage effluent
	July 1972	N86 77	" "	" "
Boyne	May 1973	N72 45	Brown trout	-
	July 1973	065 75	Salmon	-

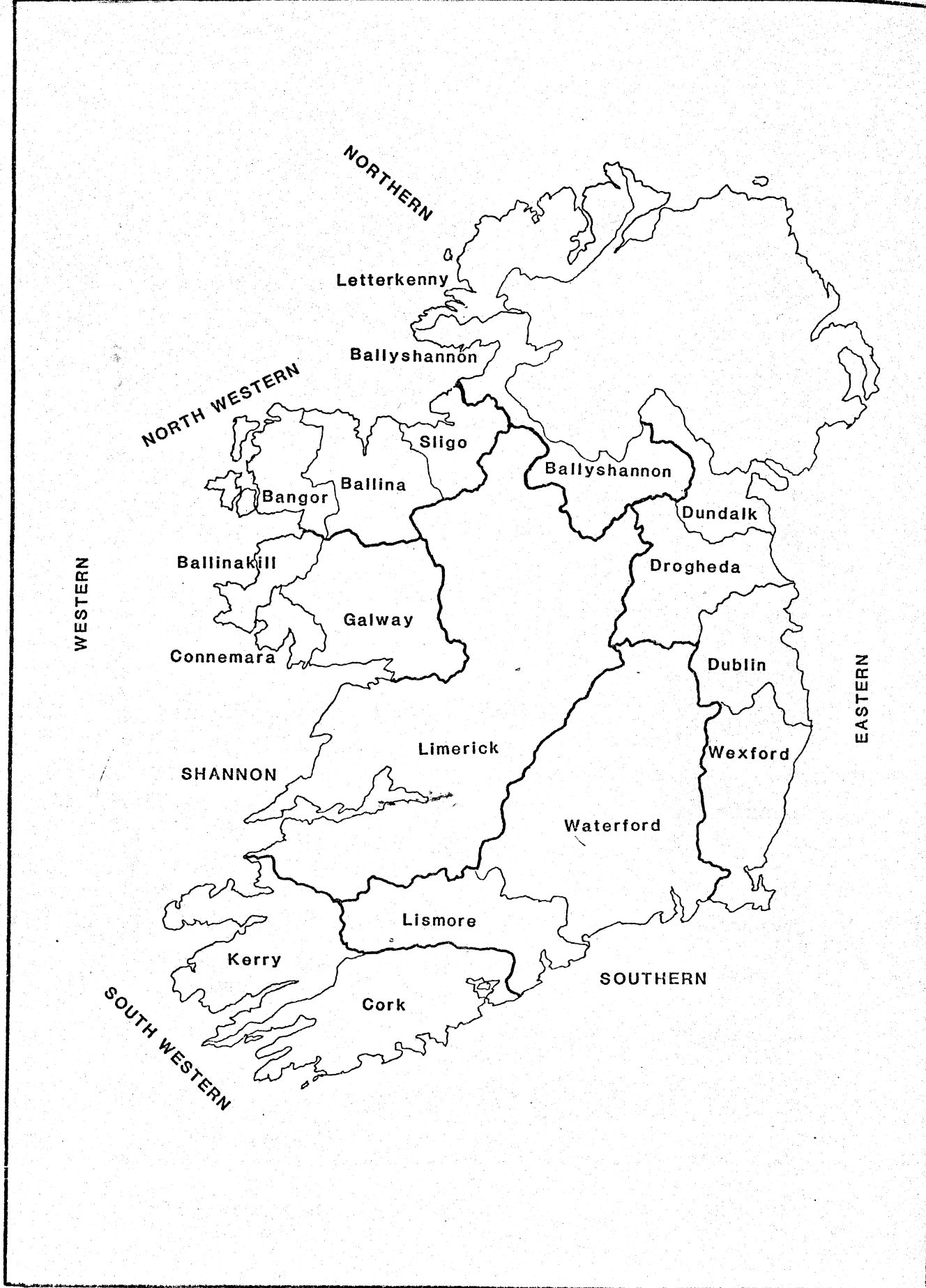


Figure 1. Fisheries Regions (in capitals) and Fishery Districts.

# Number of Fish Kills 1969-1987.

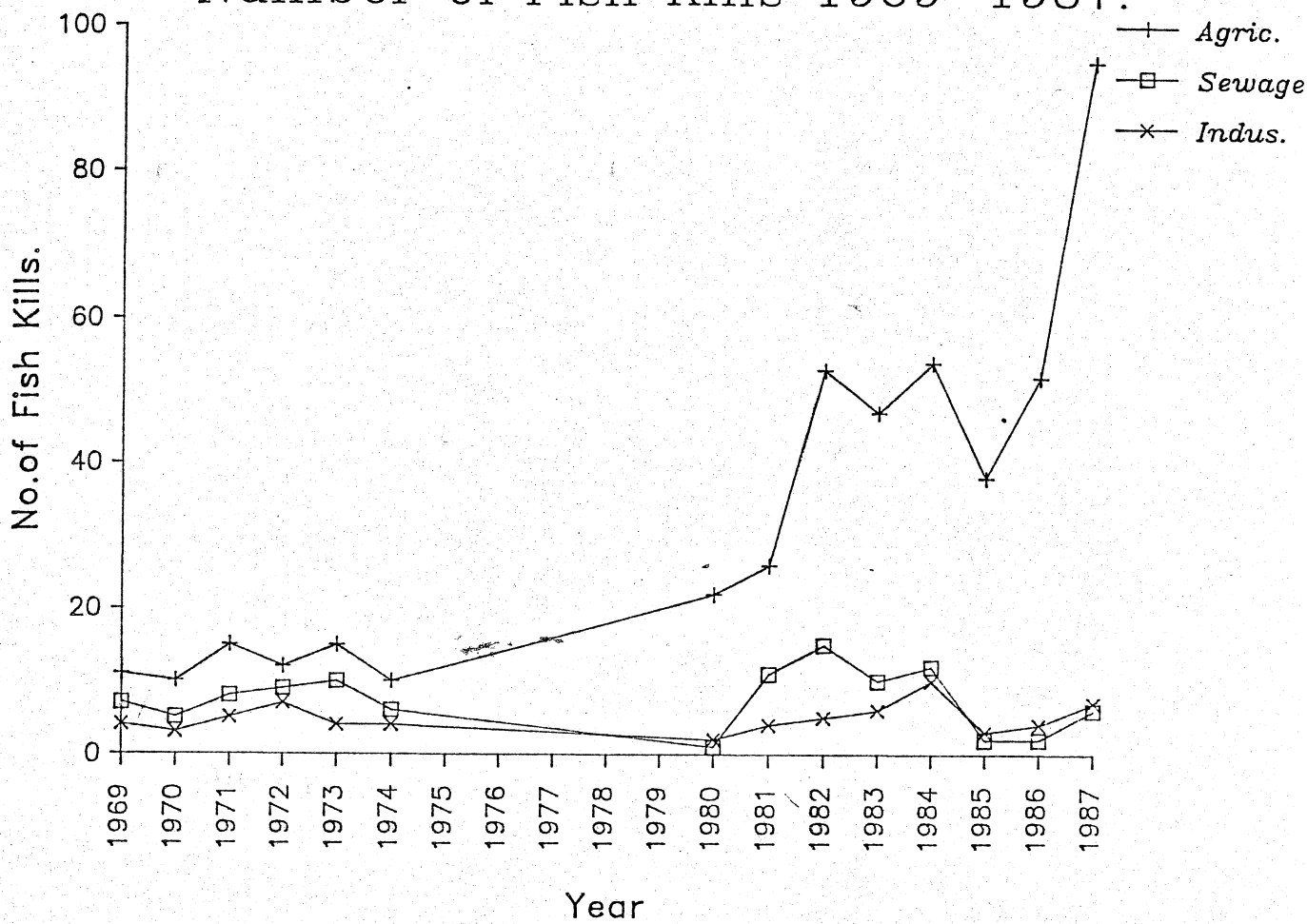


Figure 2. Numbers of fish kills from three primary sources: Industrial, Sewage and Agricultural.