



NEW ZEALAND
MINISTRY OF AGRICULTURE AND FISHERIES

FISHERIES TECHNICAL REPORT
No. 149

PROCEEDINGS OF THE 1974
SEMINAR ON FRESHWATER
POLLUTION IN NEW ZEALAND

R. W. LITTLE, D. SCOTT, and W. SKRZYNSKI (EDITORS)

WELLINGTON, NEW ZEALAND
1977

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PROCEEDINGS OF THE 1974 SEMINAR ON FRESHWATER POLLUTION
IN NEW ZEALAND

R.W. Little
D. Scott and
W. Skrzynski (Editors)

National Water Protection Committee
of Acclimatisation Societies
c/- Fisheries Management Division
Ministry of Agriculture and Fisheries
Wellington

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Editors' Foreword

This seminar was proposed by the National Water Pollution Committee (now Water Protection Committee) of Acclimatisation Societies, and after considering a more ambitious training programme, the present length was agreed on as practicable. The organisation was handled by the Chairman, R.W. Little, and Secretary, D. Scott, with able assistance from Allan Kilner, and the choice of Lincoln College seemed the right one.

The committee, acting on the recommendation from the participants, decided that the proceedings should be published. The Fisheries Management Division of the Ministry of Agriculture and Fisheries agreed to assist with editing and to publish the proceedings.

The proceedings comprise all formal talks with participants' comments after each (these comments and those at informal sessions were recorded on tape and reproduced in an edited form), the resumes of activities during the field day and the discussion workshop, the text and results of a written examination (in the form of a multiple choice test), the results of a written anonymous questionnaire on the usefulness of the seminar and a list of participants. To assist in planning similar seminars the agenda with a time-table is also included.

R.W. Little, D. Scott and W. Skrzynski,
on behalf of the National Water Protection
Committee of Acclimatisation Societies.

IntroductionC.R. Anderson, Ashburton Acclimatisation Society

The official programme of this seminar shows that the introduction would be by the Chairman of the National Executive of Acclimatisation Societies. I regret to advise you that Mr Dan O'Connor is unable to attend this occasion because of another commitment and has asked me as his deputy to act for him today.

Active executive members of the Acclimatisation Society organisation are very busy men. Sitting in the plane on the way up to the last Freshwater Fisheries Advisory Council Meeting, I went through my diary and estimated that on the average I spend about 10 hours per week on Acclimatisation Society matters. I asked Dan the extent of his involvement, and about 50 miles later he took his pipe out of his mouth and quietly replied "At least twice that". So I trust that you will understand and excuse his absence, and appreciate the time and effort he contributes. I trust furthermore that you will excuse me in a few minutes when I have had my say, as I find it expedient to work for a living and have a meeting to attend in Christchurch in half an hour.

Searching for the quotation by someone better qualified than I am, to preface my remarks, I could find nothing better than the words of Dr Dael Wolfle, Executive Officer of the American Association for the Advancement of Science, writing in the British "Science Journal" in 1969. He said "Administrators and the informed public need to understand at least the basic concepts of science and the organisation of scientific work. Without this understanding, the scientific elements present in all social and economic issues cannot be assessed and important projects will fail for lack of public support." If you feel you have heard me recite these words before, you must have been at the Quinnt Salmon Fishery Symposium in 1971, where I found them just as relevant.

Scientists have been heard to bemoan that administrators are all too often insufficiently informed to formulate adequate policies on matters involving science and technology. The administrators should not take all the blame for this, because all too many scientists are either unwilling or unable to communicate scientific information in a form that can be readily and usefully assimilated by the administrators. In fact, some professional experts appear to resent the incursion of an involved layman into their field of knowledge, and are not averse to attempting to cut him down to size by the use of sophisticated jargon.

Even so, the administrators (of whom I am a representative) must make the effort to seek out scientific knowledge and become better informed. Particularly, I would recommend that they seek out those who have the knowledge and from whom they find they can learn readily. That is why this Pollution Seminar is being held. Do not lose sight of the fact that, in common with the Salmon Symposium, this seminar has not been organised by the Water Resources Council or the Ministry of Agriculture and Fisheries, but by the Acclimatisation Societies themselves.

Whatever may be the outcome of the current re-organisation of Acclimatisation Societies and the administration of freshwater fisheries and wildlife, it seems to me that more responsibility and authority will be put in the hands of our field officers and their supervisors. They will all need increased knowledge of the scientific and technological aspects of their work, and they will expect their councillors to be well informed. Unless Society councils and executives are to become mere rubber stamps, their members must be more than avid anglers and crack shots - they must know how to ask the right questions, and how to appraise the information they get in reply. They must have standards by which to appraise the information, be it fact or opinion or expediency given them by Cabinet Ministers, by departmental heads, by scientists, by field staff, and by sportsmen, or else resign the right of intelligent participation in the consideration of issues that are their statutory responsibility.

This seminar will, I trust, be indeed a seminar and not merely a course of instruction. According to my dictionary, a seminar requires the guidance of a tutor, but also requires working together and discussion. From my acquaintance with many of you, I am confident that few of you are over-awed by experts or reluctant to comment or ask questions, and I am pleased to see from the programme that the organisers have provided opportunities accordingly.

It may be relevant to remind ourselves that while the statutory responsibilities of Acclimatisation Societies in relation to water pollution are designed for the protection of fish and wildfish, rather than with the health of the angler in mind, the public looks generally to us in the first instance to deal with water pollution. I am sure that more prosecutions have been taken under the anti-pollution provisions of the Fisheries and Wildlife legislation in New Zealand, than have been taken under all other legislation. It is perhaps significant that the survival of salmonids is often taken as a ready guideline to water purity.

In my own district of Ashburton, when a farmer discharged a toxic herbicide into a water race resulting in a considerable fish kill, the County Council decided that "no prosecution was recommended", and the Catchment Board stated that it "cannot tolerate" the pollution of water races. The Acclimatisation Society took legal action and prosecuted the offender successfully. We are generally fortunate in the Ashburton district as far as pollution is concerned, our major problem being Ashburton Borough sewage which is inadequately treated before discharged into the Ashburton River about 9 miles from the sea, thus depriving many recreational users of opportunities safely to picnic, swim or fish in what should and could be a major natural recreational facility for the people of the district. A new sewage treatment plant is planned, but in the meantime the sewers themselves are not

coping and there have been illegal discharges from the Borough system into natural water. We also have to be alert in an area where irrigation is popular, that abstractions leave sufficient residual water to adequately dilute any form of pollution which may not be harmful under normal flow conditions.

Here today we have an admirable mixture of administrators and professionals, councillors and field officers, scientists and laymen, all of whom are in positions where they can assist one another in the protection of our natural environment by the alleviation of water pollution. That assistance must not be confined to this Seminar, but must continue when you all return to your usual habitats. Our National Water Pollution Committee is a fine example of the Societies working together on a national basis. The National Executive commends the Committee for its persistence that this seminar could and should take place; we commend all the organisations that have sent participants to this seminar; we commend all those councillors and field staff and departmental officers who are attending this seminar; and I shall now be quiet and go away, and let you get on with the work in hand.

Mr Anderson is the President of the Ashburton Acclimatisation Society, a member of the Southland Executive, Salmon Committee and Freshwater Fisheries Advisory Council.

SESSION 1 - POLLUTION AND THE LAWThe Pollution Provisions in the Freshwater Fisheries Regulations 1951P.C. Macnab, Marlborough Acclimatisation Society

1. The provisions in the Freshwater Fisheries Regulations 1951 relating to pollution are Regulation 103 (as amended by Regulation 4 of S.R.1970/101), Regulation 104 and Regulation 106. These regulations are as follows:-

Regulation 103 (1) "No person shall cast or throw into any waters or discharge or cause to be put or discharged into or placed near the bank or margin of any waters any sawdust or sawmill refuse, lime (other than agricultural or slaked lime), sheep dip, flaxmill refuse, oil, chlorinated hydrocarbon pesticide, or any other substance to such an extent as to cause the waters to be poisonous or injurious to fish or the spawning grounds of fish or the food of fish.

(2) Every person commits an offence who does any act in contravention of this regulation, and is liable on summary conviction to a fine not exceeding \$2,000, and, in the case of a continuing offence, to a further fine not exceeding \$20 for every day on which the offence has continued."

Regulation 104 "No person shall cast any rubbish or refuse or material of any kind into any waters or on any river bed."

Regulation 106 "No person shall leave any fish or any cleanings or offal from fish lying unburied on the bank or margin of any waters."

The fine for an offence against Regulation 104 or 106 would be a maximum of \$300 (see Regulation 112 as amended S.R. 1970/101).

2. While it does not fall strictly within the terms of this paper I will include the provision relating to pollution contained in the Wildlife Regulations 1955. This provision is very similar to Regulation 103 but contains certain differences which could in some instances render a prosecution more certain of success.

WildLife Regulations 1955, Amendment No. 6 (S.R. 1972/30) Regulation 43A

(1) "No person shall cast or throw into any waters or discharge or cause to be put or discharged into or placed on the bank or margin of any waters or in a position where it is likely to fall or descend or be washed or percolate into any waters any sawdust, or saw mill refuse, lime (other than agricultural or slaked lime) sheep dip, flaxmill refuse, oil,

chlorinated hydro-carbon pesticide, or any other substance poisonous or injurious to wildlife or the food of wildlife.

(2) In this Regulation the term "waters" means any salt, brackish or fresh waters in New Zealand or on the coasts or bays thereof and includes artificial waters."

The fine for a breach of this Regulation would only be a maximum of \$100 (see Regulation 44).

"Wildlife" is defined in Section 2 of the Wildlife Act 1953 as meaning "all animals that are living in a wild state not including those set forth in the sixth schedule" (noxious animals). "Animals" is defined in the same section as meaning "any mammal (not being a domestic animal or a rabbit or a hare or a seal or other marine mammal), any bird (not being a domestic bird), any reptile or any amphibian." "Bird" is defined as meaning "any bird whether native, introduced or imported or that has migrated to New Zealand or has arrived in New Zealand and become established there but does not include any domestic bird".

3. Regulation 103 Freshwater Fisheries Regulations

(1) This regulation envisages two separate types of pollution:

- (a) pollution from specified substances, that is, sawdust, sawmill refuse, lime, sheepdip, flaxmill refuse, oil, chlorinated hydro-carbon pesticide,
- (b) Other substances.

The important difference is that with a specified substance it is only necessary to prove its presence. With a non-specified substance it is necessary to prove that it is present in a sufficient quantity to cause the waters to be poisonous or injurious to fish or the spawning grounds of fish or the food of fish. It is useful to contrast this provision with the provision in the Wildlife Regulations which do not contain the words "to such an extent as to cause", meaning that under these Regulations it is not necessary to prove anything was in fact poisonous only that the substance was poisonous.

It is of course always desirable, if possible, to prove the extent of the pollution and damage done by it because if it is a serious case this will greatly add to the amount of penalty imposed.

(2) "Cast or throw" - these words mean an actual and physical putting the substance into waters.

"Discharge" - means sending the substance down a pipe or channel or similar so that it will find its way into water.

"Cause" - to be put or discharged into. In simple terms "cause" means to make it happen. It is apt to cover such situations as where one person tells another to do the act, where somebody sets up an operation which if it goes wrong will result in polluting matter entering the water or where somebody pulls the lever.

"Placed near the bank or margin" - means to place the substance at such a distance from the bank or margin that there is a likelihood of it getting into the water. Depending on the nature of the ground this could be quite an appreciable distance, e.g. sawdust dumped some distance from the edge of water but within reach of a reasonable flood would be placed near the bank or margin. It is probable that the words "where it is likely to fall or descend or be washed or percolate into" in Regulation 43A of the Wildlife Regulations are surplus and do not really extend what the Courts would be prepared to hold as "near the bank or margin".

(3) "Waters" - this word is defined in Regulation 2 of the Freshwater Fisheries Regulations 1951 as meaning "any salt, brackish, or freshwaters in New Zealand or on the coasts or bays thereof and includes artificial waters, but does not include private waters". The term "private waters" means "any waters wholly contained within the land of one private owner, but does not include the water of any permanent river, or stream, or lake which passes or extends from the land of one owner to that of another nor any water not wholly contained within the land of one private owner". Private waters are fairly rare within New Zealand other than the privately owned lakes with no outlet. If there is an outlet which is polluted, it would flow either into a non-private water in the form of a river or the sea and the polluter could be prosecuted.

(4) Cases on Regulation 103. The following cases are cited by way of example. Many of them are on the predecessors of Regulation 103 which were in different terms.

Police v. Stewart 1926 22 MCR page 23. The defendant was charged under the then Regulations with allowing sawdust to flow into a river. The sawdust had been deposited on or near the bank. The defendant knew that the sawdust was escaping and floating down the river and he took no steps to prevent it from doing so. He was convicted. Under the present Regulation a defendant in these circumstances should be charged with placing sawdust near the bank of waters.

David v. Silverstream Dairy Co. 1932 29 MCR page 1 (Affirmed on appeal in the Supreme Court 1934 NZLR 563). It was held that the control of the stream by a local authority did not remove it from the category of waters within the meaning of the Regulation. The position could well be otherwise if the local authority had control of the waterway and itself did or permitted the act complained of e.g. A Catchment Board in the course of weed control operations.

Baxter v. Smith 1904 GLR 341. The defendant was charged with casting sawdust into a river. The facts were that he had allowed sawdust to fall into an artificial channel and thence flow into a nearby river. He was acquitted. Under the present Regulations he would be convicted if charged as "did cause to be put or discharged into."

Re: Booth 1908 NZLR 774. It was held that placing near the bank or margin means placing so near the bank that there will be an appreciable risk of the substance entering the stream.

Gorton Bros. v. Otago Acclimatisation Society 1958 NZLR 801. The defendants were convicted of placing sawdust near the bank of water. There were two dumps, one approximately 30 yards and the other 40 yards from the river. The sawdust reached the river as the result of a flood. Floods of this magnitude had occurred occasionally in the past. In considering the meaning of the word "near" Mr Justice Henry said "there is no precise meaning of the word 'near'". It is always a question of fact which must be determined after a consideration of the context in which it is used and the circumstances to which it has to be applied. It has been held to include an area from 2 to 10 miles away. In the present case nearness has reference to any area where it is likely that the deleterious matter will enter the water. The general effect of the evidence was that the sawdust in respect of both dumps was so placed that there was always a danger in wet weather and particularly in very wet weather either locally or in the watershed area of the river that the sawdust would be washed from the dumps and find its way into the river which was close by. The likelihood of this happening by reason of the situation of the dumps in relation to the river and configuration of the land was high. It would be plain to any reasonable man who put his mind to the problem that the area of the dump was so near to the river that there was a danger of sawdust finding its way into the river. No one acting reasonably could overlook the possibility of flooding reaching the dump so situated. That being so each of the dumps come exactly within the words "near the bank or margin of the river".

(5) Mens Rea. This is a very technical legal concept which means guilty intent. In most prosecutions but not all, it is necessary to prove that the defendant had guilty intent. It is questionable whether it is necessary to prove guilty intent in a prosecution under Regulation 103. It should always be shown if possible as if a person knew precisely what he was doing and did it deliberately; it reflects substantially in the penalty imposed. There are two cases which I have found on mens rea.

Wellington Acclimatisation Society v. Nireaha Dairy Company 1963 NZLR 598. The Dairy Company was charged with placing into waters a liquid, namely casein waste, noxious, injurious or harmful to fish (this was the then wording of the Regulation). It was agreed that the company had intentionally discharged the waste but that it did not know that casein waste was harmful etc. to fish. In fact, it had been discharging for many years without problem and on this occasion caused the damage by deoxygenating the water at the time of low flow and suffocating the fish. The defendant was acquitted because it did not know that the substance was harmful to fish. It was held that if the defendant could raise a reasonable doubt in the mind of the Court that it did not know the substance was harmful it would be entitled to be acquitted, but that before a defendant can succeed in this defence there must be at least some evidence that it did not know of the danger. This requirement is at least enough for the defendant to have to call evidence and then of course he is open to cross-examination on the reasonableness or otherwise of his belief.

Alphacel v. Woodward 1972 AC 824. This is a case decided in England by the House of Lords on a prosecution which the Rivers (Prevention of Pollution) Act 1951, Section 2(1) of which reads "a person commits an offence if he causes or knowingly permits to enter a stream any poisonous, noxious or polluting matter". Effluent escaped from a settling tank owing to the blocking of a pump. It was held that "causes" did not impute the concept of a guilty intent and that it had to be given a commonsense meaning and that the defendant had caused the polluting matter to enter the river in that the complex operation which had led to the polluting matter entering the river in the event of the pumps not operating properly had been deliberately carried on and that a defect in any one stage of it (even assuming that happened without negligence) could not enable the defendant to say that it had not caused the polluting matter to enter the river. In other words it was held that the section created an absolute offence.

In my opinion following Alpacel "causing to be put, discharged or placed" would in New Zealand now be held to be an absolute offence. It is questionable as to whether it would be necessary to prove knowledge that the substance was toxic as required by Nireaha. It can be argued that the cases related to separate issues. On the other hand, I think it more likely that if the section creates an absolute offence it would be absolute in all respects and that lack of knowledge would be relevant only to penalty. This issue will require to be tested again in New Zealand Court when the occasion arises.

4. Regulation 104. As far as I am aware there are no reported cases on a prosecution under this Regulation. As it refers only to the "casting" of rubbish refuse or material of any kind into any waters or on any river bed, it is necessary to prove an actual physical placing. The meaning of the words "rubbish" or "refuse" is clear enough. The meaning of the words "material of any kind" is open to some doubt. Normally in this type of Regulation this wording would be interpreted as meaning material similar to the nature of rubbish or refuse. In my opinion, especially in view of the presence of Regulation 103 which deals with matters which are directly harmful to fish, etc., it would probably be interpreted in that way here. This is however by no means certain and it would be well worthwhile in a case where there might be difficulty in proving an offence under Regulation 103 to lay a charge under Regulation 104 also.

5. Regulation 106. This is clear in its meaning and really pertains only to anglers or perhaps eelers who do not form the subject of this seminar. I will therefore not deal with it further.

6. The Effect of the Water and Soil Conservation Act 1967

This Act (including its 1971 amendment No. 2) provides in section 21 for registration of lawful discharges existing as at the 9th September 1966, in section 24 for granting of new discharges, in sections 26A to 26K of 1971 amendment for the classification etc. of waters. It is not my intention to consider these provisions as such but to consider their effect on a prosecution under Regulation 103.

(a) Existing lawful discharge. I am clearly of the view that Regulation 103 applies in the event of pollution from such a discharge. Section 21 applies only to lawful discharges and if the discharge offends against Regulation 103 it cannot be lawful.

(b) Section 24, a new discharge. This can basically be divided into two situations. First where the discharge does not comply either with the terms of the permit issued or with Regulation 103 and second where the discharge complies with the terms of the permit issued but nevertheless offends against Regulation 103.

In my opinion, where a discharge offends against both the terms of the permit and Regulation 103 it is almost certain that a prosecution could be brought under Regulation 103. It would, however, be wise to lay in addition an information under section 34 of the Water & Soil Conservation Act for discharging other than as authorised.

The situation where the discharge complies with the water right but not with Regulation 103 is much more complicated. The 1971 amendment repealed the Waters Pollution Act 1953 which contained in section 30 the provision that discharges granted under the Waters Pollution Act did not relieve the discharger from compliance with all other legislation. This provision was not repeated in the 1971 amendment. The only reference to other legislation in the Water & Soil Conservation Act is in section 38 which states that a person is not relieved from complying with the provisions of the Health Act. The provisions of the Health Act are contained in sections 29, 30 and 60 and amount to either polluting a water supply or putting a watercourse in such a state as to be offensive or likely to be injurious to health. I think it would probably be successfully argued that the Water & Soil Conservation Act provides a complete code and no action can be taken against anybody complying with its terms under any other statute except the Health Act. The argument in favour of the applicability of Regulation 103 would be that it is not referred to at all in the Water & Soil Conservation Act and that as it is specific legislation it should not be affected by legislation dealing with water generally.

(c) Discharge into Classified Waters. In this case there may be a situation where the discharge complies neither with the classification nor Regulation 103 and on the other hand a situation where it complies with the classification but not Regulation 103. My views are the same as those expressed on discharges under section 24, namely that where the discharge does not comply with either

regulation 103 or the classification, a person should be prosecuted under both, but that if the discharge complies with the classification but not Regulation 103 a prosecution under Regulation 103 probably could not be brought and it would be necessary to proceed under section 34 of the Water & Soil Conservation Act only.

It is of course a very serious matter if our fisheries are injured by complying discharges and we can do nothing about it. Clearly a lot of legal research will be needed on this point and it may well be necessary to bring a test case.

ADDENDUM

Since writing the above paper I have received a copy of the decision of Mr Justice Cooke in the case of Bell v. Taupo Totara Timber Company delivered at Rotorua on 27th May 1974. This is an important case which resolved some of the problems in connection with Regulation 103. The following issues are covered:

1. "Placing" is not a continuing offence and a date of placing within six months from the laying of the information must be established.
2. In the case of a specified substance, it is not necessary to prove damage, etc.
3. In regard to the interpretation of "causes" it follows the Alphacel case, that causing is an absolute offence but holds that the cause must be from current operations. That is, something dumped by the bank could not be complained of unless a date of placing within six months could be established.
4. Considers, but not as an essential part of the decision, that the 1970 amendment to the regulation overcomes the mens rea issue raised in the Nireaha case.

Mr McNab is a Barrister and Solicitor from Blenheim.
He was then President of the Marlborough Acclimatisation Society and a member of the Water Protection Committee and National Executive of Acclimatisation Societies.

Comments on P.C. Macnab's Talk

D. Kelly (Otago): Under Regulation 103 you stated that liability was absolute in that you did not have to prove that a specified substance was toxic to fish, but I lost a case last week on this very point.

Macnab: Mr Justice Cook has confirmed my opinion in the case of a timber company, so I suggest you appeal.

D. Scott (Otago): In Otago Acclimatisation Society vs. Alliance Textiles, the same thing happened. We showed that dieldrin was being discharged into a river, but in such small quantities that it was difficult to demonstrate damage.

Macnab: Justice Cook did comment on this point. He referred to the general discretion of Magistrates in such cases.

D. Scott (Otago)" Well then there is not absolute liability.

Macnab: I would distinguish between a small amount added on one occasion and small amounts added so as to be cumulative. It is absolute liability but the Magistrate could either convict and discharge, or fine the offender.

J. Checketts (North Canterbury): Some time ago there was an accidental discharge of tar, and the Drainage Board took the prosecution. The case was dismissed because the defendant claimed that some vandal had turned the taps on. In this, and another similar case, the offending substance was a specified one.

Macnab: It depends on the circumstances. If it was a genuine case where a vandal had turned the taps on you might have trouble getting a conviction under 103. On the other hand if it happened more than once, the defendant could be in trouble.

R.R. Sutton (Southland): In the Wellington case involving the dairy factory you mentioned lack of guilty knowledge. If the Society's field staff had contacted the company and informed them of the regulations would the same things have applied?

Macnab: Definitely yes! It is very desirable to keep all potential offenders well informed.

D. Main (Hawkes Bay): Does the Water & Soil Conservation Act take precedence over the Fisheries Act in respect of a discharge?

Macnab: If there is an authorised discharge that complies with the classification you could be in trouble. It is a point that will have to be argued at some stage.

D. Scott (Otago): Prosecutions brought by Otago and Southland under 104 have made a point of establishing, that solids were present in the discharge, by placing a fine net over the pipe and filtering off the solids. The Magistrate accepted this, Any comments?

Macnab: I think there is a difference between casting and discharging, so the point is arguable.

THE POSITION OF REGIONAL WATER BOARDS

A. McMillan, Southland Catchment Board

Introduction

Firstly, Mr Chairman, I would like to thank your organisation for the opportunity to present this paper this afternoon. Both of our organisations have a somewhat common interest in maintaining water quality and supplies and occasions such as this Seminar can only be beneficial in promoting an understanding of each other's points of view.

In the past there have been criticisms of the Boards by wildlife interests because of the great deal of work done since the war which adversely affected swamps, trout streams and other wildlife areas. Considered in retrospect some of this criticism is justified but at that time there was neither public awareness or demand that any other methods be employed. Certainly no finance was available to assist farmers in employing more costly methods of development to protect environmental issues.

From comments I have heard from time to time I feel that in Southland there is a better working relationship between the Regional Water Board and the local Acclimatisation Society than possibly exists in some other areas. It is difficult to find a reason for this but perhaps it is because we both try to understand the other's problems and there are constant discussions at staff levels.

In preparing this paper I was aware that some of the other papers to be presented would be dealing with factors common to my own and to avoid trampling upon someone else's garden I have tried to avoid some of the issues I would otherwise have covered.

With this in mind I have tried to keep clear of the Southland Water Classification and the Appeals against it and deal only with freshwater and then only that part of it which affects angling interests.

The Water and Soil Conservation Act 1967

In the 1960's there was an obvious growing need to control water pollution in a manner which was more satisfactory than the Pollution Regulations 1963 provided for. Overseas results of not recognising the problem soon enough were there for all who cared to see them. It was the fear of falling into the same trap as overseas countries had done and having an appreciation of the value of clean water that in 1964 the Wellington Branch of the New Zealand Institute of Engineers organised a conference on the Use of Water. This was attended by representatives of a very wide field of interest, from Municipal Engineers to Recreational Water Users. This conference passed a resolution

calling on the Government to promote a Policy for the best use of the Nation's Natural Water. This was the beginning of the Water and Soil Conservation Act 1967.

Perhaps no other legislation has affected such a wide section of the population as has the Water and Soil Act but it must be remembered that it came about to satisfy public pressure for a National Policy in respect of Natural Water. Although we will not all agree on its form or standards, it has already had obvious effects on our thinking with respect to water use.

We all know of the new problems created by the Act but I think that any far reaching legislation such as this could not be expected to operate smoothly right from the start and a settling down period is obviously going to be needed.

Basically, the Act has two separate functions. The first is that it provides machinery for the allocation of water for use and the second is that it provides for control of water pollution. Both of these activities are controlled through a system of Water Rights by the Regional Water Board or the Water Resources Council, depending on circumstances.

I will deal with the allocation side of the Regional Water Board's function for a start for although we are concerned with pollution at this Seminar, pollution need not necessarily be restricted to the concept of pouring something into a watercourse. From a fisheries point of view thermal pollution, a possible result of over-extraction, can be just as lethal.

Problems of Water Abstraction

Surprising as it may sound to Northerners, Southland is not blessed with an over abundance of water in the summer months. Most of us in Southland have been blissfully unaware of the potential shortage of water during the low flow periods of December, January, February, March, and it has taken three dry spells in the last four years to highlight the problem. Our pursuit of drainage schemes to dry the land in winter has had a carry over by quickly removing surface water without allowing the time necessary for infiltration to replace groundwater. Because of this pre-occupation with drainage most stream flow gauging and flow measurements available are related to high flows and very little work has been carried out recording or measuring low flows. These low flows, we now find, are critical because they generally occur when water demands for industry, irrigation and recreation are at their highest. From the Acclimatisation Societies' point of view the summer demand for sufficient water by other users is also critical especially as one moves into the areas of high total sunshine hours.

Here, because of the risk of raised water temperatures a high base flow is desirable to keep temperatures down and thus oxygen levels up.

Naturally, as soon as indications of water shortage or potential water shortage are known there is a rush by users to secure an allocation often above immediate needs and the problem is thus accentuated.

I would think that probably over the whole of New Zealand this is happening as our population climbs and the industrialisation trend continues. Those interested in the use and availability of water must therefore anticipate the trend and collect information against the time when in order to protect their interests factual information can be presented in argument. This applies particularly to those interests whose requirements are difficult to define such as those of Acclimatisation Societies, recreational users and wildlife interests. Some Boards have already studied this problem but a national effort is clearly indicated in planning water allocation.

This need has recently been recognised by the Government who now provide finance through the National Water and Soil Conservation Authority to the Boards for the preparation of such Water Allocation Plans.

These Allocation Plans are to be prepared after a study of the resource has been completed and will be an assessment of the actual and future competing uses with a statement as to how the Board intends to allocate the resource. When completed, this Plan is available for public inspection and comment before final adoption in order to allow any anomalies or omissions to be corrected. Where a strong objection was not met by the Board in the desired alteration of the plan then the party aggrieved could still exercise his right to object to the issue of the necessary Water Rights. The Plan, hopefully, would limit these objections to a bare minimum by removing the cause before hand. The method my Board intends to use to achieve this, is to contact as many as possible of the interested organisations and people during the preparation of the Plan so that all reasonable demands can be assessed, and included, if possible, in it. There is also provision in the procedure for Reviews of the Plans to be undertaken from time to time to enable the best use to be made of the available water and to allow the results of the increased knowledge of the resource to be utilised.

In preparing the Water Allocation Plans for a catchment, the Regional Water Boards are bound to consider all users and this includes the needs of wildlife habitats and fisheries. In fact, this use of water is specifically included in the Title of the Act.

(Although one wonders at the significance of the order of mention being after "primary" and secondary industries" and "water supplies of local authorities" but before "all recreational uses of water"). One difficulty is to set the uses of water in order of priorities. It is likely that wildlife and fisheries interests are fitted in somewhere between domestic and stock water (where no other supply is obtainable) and wild flood irrigation. However, in my opinion, these priorities could vary from district to district. Take for instance an area where underground water is in plentiful supply - then stock water and domestic supplies could be obtained from bores and these uses should perhaps be encouraged to protect the low flow in streams and thus to preserve wildlife and fishing interests. Obviously a general policy on priorities would be dangerous and the principles will vary not only from district to district but from stream to stream. It does not help the situation to discover that stock water can be taken without a right and piped a considerable distance to land which prior to the Act had no legal right to the water for this purpose. Certain stock water demands, accentuated by a move to cattle instead of sheep, can result in water depletion to the detriment of wildlife.

The difficulty facing the Regional Water Boards will be to decide what minimum flow should be left in a stream and at what stage should abstractions be limited. Obviously there will be conflict of interest for, if a farmer has spent \$20,000 on irrigation equipment, and this has already happened in several places in Southland, careful judgment is necessary to decide at what stage limits should be placed on the use of that equipment. The stakes are high enough to make it worthwhile for the irrigator to make a fight of it. Obviously then, Boards will be relying on Societies and other expert bodies for assistance in defining acceptable low flows and to be frank it is not much help just to "think of a number" when asked by the Regional Water Board for the fisheries ideal minimum requirements. It is going to take study, research, observation and even then keen judgment. The practical expertise in this matter is in the forces of the Societies, Agriculture and Fisheries and Internal Affairs, who should grasp the opportunity to stay in front of the field. My advice would be that you should be keeping a routine check on conditions and flows during dry spells, assessing the fisheries and if possible working with the Board's staff to obtain flow figures, gauge height, frequencies, etc. Many of these things you will have already collected over the years and often the Boards will have sufficient flow measurements taken to allow fishing conditions in the past to be related to the actual flow at that time.

If, ultimately, however after the preparation of an Allocation Plan, there appears provision for a lower flow than is considered desirable to leave in a stream from a fisheries point of view, several forms of assistance can be invoked. Detention dams are an effective way of augmenting low flows, while the purchase or reservation of

some large swamps or peat bogs can have a similar effect upon outflow streams. Both these methods have been used in Southland as a means of protecting the Society's interests although I think they may have been an indirect result rather than a prime objective. It may well be that in an effort to obtain water from a stream industry will have to contribute to the cost of water harvesting and there are indications that a charge for water is being considered at the moment.

Faced with a diminishing low flow due to domestic, stockwater, fire-fighting or other uses lawfully permitted under the Act and not requiring a Water Right, a Society could be placed in the position of either abandoning a watercourse and becoming involved in costly fish salvage operations or else adopting one of the other alternatives.

My own Board has carried out considerable bank protection works along eroding bends on streams and rivers where the flood velocities are too high to allow willows to establish on their own. This work consists of, on the smaller streams, heaps of rock every 10 to 15 metres, causing deep scourholes around the toe of the bank. Erosion is thus checked until willows can be established in between the rock heaps. In low flows these scourholes provide a haven for trout and provide areas of cooler water in the shade of the willow trees, which also provide some protection from predators. In the larger rivers the principle adopted is the same but the groynes are much larger. In the Upper Oreti River, which has an average depth in summer of some 0.5 - 1 m, scourholes 40 m or more long, have formed with 3 - 3.5 m of water at the wearing end of groynes.

The fish life in these holes during droughts and periods of high water temperatures is remarkable and our own Society is carrying out experiments on the small Tomogalak Stream in Northern Southland with a view to placing rock on bends for this very purpose. Carried out with the approval of the Catchment Board this method can be very successful and even be a good public relations exercise with the local farmer.

On the credit side, those Societies whose rivers flow from the eroded high country catchments will be pleased to note the recent interest in these areas by the Government agencies. The conference called in Christchurch in 1972 to discuss the future of the lands in the South Island High Country retired from grazing has culminated in a joint policy statement being signed by Lands and Survey Department, N.Z. Forest Service and the National Water and Soil Conservation Authority. This policy statement contains two principles of great interest to downstream water users:

1. Soil conservation and water management are of absolute priority in these areas.
2. Secondary uses must be compatible with these priority uses.