

directly interested in the conservation of wildlife. I feel that the battle is only started and that this Society must give special attention to the protection of fish. We must not lull ourselves into a feeling of satisfaction or confidence that anything constructive has been done for fish as such, and we need to give it further attention and support.

(The motion was seconded.)

THE PRESIDENT: Of course, that motion carries with it "subject to such alterations as the President-Elect may deem wise and necessary."

(The motion was voted upon and carried.)

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## REPORT OF THE COMMITTEE ON AMERICAN FISH POLICY

E. L. WICKLIFF

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### HISTORY OF THE NORTH AMERICAN FISH POLICY

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During the Sixty-third Annual Meeting (1933) of the American Fisheries Society, President Fred A. Westerman was authorized, by resolution, to appoint a committee to draft an American Game-Fish Policy and to report back at the next annual meeting.

At the 1933 session Mr. Seth Gordon, at that time President of the American Game Association, presented a paper entitled, "Scientific Management—Our Future Fisheries Job," in which he pointed out the need for an American Game-Fish Policy.

On January 22, 1934, the Council of the American Fisheries Society held a joint meeting with the International Association of Game, Fish and Conservation Commissioners at the Pennsylvania Hotel in New York City and sponsored the American Fish Policy in cooperation with International, National and Regional groups.

On January 23, 1934, President Westerman read a paper at the American Game Conference entitled, "An American Fish Policy," in which he pointed out the basic importance of the biological, economic and social phases of our fisheries problems and suggested a more orderly course of fisheries management in the future. He suggested there would be differences of opinion on most points, and at this time your Committee can testify to the accuracy of his statement.

Under date of May 29, 1934, I received a carbon copy of a letter sent by President Westerman to Secretary Gordon announcing the appointment of a committee of fifteen members to draft an American Fish Policy.

A Progress Report was presented to the Society on September 12, 1934, at the Montreal meeting.

At the 1935 Tulsa meeting an outline of the proposed North American Fish Policy was presented, approved by the Society, and printed in the Transactions on pages 27, 28 and 29.

At the 1936 Grand Rapids meeting your Committee presented a 38-page progress report which was accepted by the Society. On March 19, 1937, approximately 700 copies of this revised report were distributed to the membership of the Society, and during the 1937 convention at Mexico City the Executive Committee authorized the selection of a "boiling-down committee" of five members to condense the report.

On September 15, 1937, I sent the Committee a 17-page revision of the proposed Fish Policy. To date suggestions have been received from forty-seven contributors, practically all of whom are members of the American Fisheries Society.

The Policy was reduced from 38 mimeographed pages in 1936 to 17 pages in 1937, and at present it consists of 9½ pages with approximately 6,000 words. The American Game Policy, adopted in 1930, contains 21 printed pages and approximately 11,000 words. I have available 100 copies of the revised draft for distribution to those interested, and hereby submit a copy for the record.

With the above facts before you, and after four years of effort, I move you, Mr. President, the adoption of our North American Fish Policy, and that it be printed in the Transactions of the American Fisheries Society, subject to later revision by the Society.

## NORTH AMERICAN FISH POLICY

### INTRODUCTION

It should be recognized by the various governmental agencies directly or indirectly involved in fish management, as well as by the general public:

1. That fish constitute an outstandingly important element in the immensely valuable aquatic resources of North America.
2. That fish furnish the people of the continent with a large source of high-quality food.
3. That commercial and game fishing, directly or indirectly, give employment to many thousands of people, and constitute a prime factor in the support of the populations of large coastwise and interior regions.
4. That recreation centering about fishing provides a vitally important though intangible factor in maintaining social stability in a tense, industrialized age.
5. That fish life has other important values, as in education and research.
6. That the fish resources of the continent have often been regrettably depleted in the wasteful exploitation of our natural resources, and in the despoliation and elimination of many waters.
7. That these depletions of the fish resources lead to serious economic and social losses.
8. That fish are crops, capable of being conserved, restored and increased through sound management practices.

In order to discover, initiate and maintain fish-management practices which will lead to the attainment in abundant measure of the economic and social values dependent thereon, it is of vital importance that a wise fish policy be followed. The statement of such a policy is hereby attempted, in the hope that it may serve as a guide to legislators, conservation commissioners (or boards), and officials, project supervisors, investigators and the interested public; that it will help to avoid the undue waste of energy engendered by official jealousies and conflicting ideas; and that it may focus attention on fundamentals, and lead to effective action.

On all sides there is a most urgent need for effective action to save and restore and build up the fish resources of North America. This Policy aims to point the way toward the attainment of such action. But neither this Policy nor any other is scheduled to bring about a wildlife millenium. There is no easy road, and no substitute for a combination of foresight, intelligence, courage, and uninterrupted activity. There will often be need for drastic revisions in practices.

Fish management is a live and growing field. The best judgment of the day may be far ahead of the practices in many regions, but the practices now current in the most progressive circles are bound to become obsolete within a few years. There will be need for a revision of attitudes as well as practices, and even such general policies as the one here presented will no doubt require extensive revision.

## FISH POLICY

- I. RELATIONSHIP BETWEEN FEDERAL OR DOMINION AND STATE OR PROVINCIAL GOVERNMENTS WITH RESPECT TO THE ADMINISTRATION, REGULATION, PROPAGATION, DISTRIBUTION, AND INVESTIGATION OF GAME AND COMMERCIAL FISHES AND THE DISSEMINATION OF FISHERIES INFORMATION.
1. *Administration and Regulation.* It is desirable that the administration and regulation of all fisheries should be under the separate states or provinces except where migratory fishes are the common concern of more than one state or province, when the federal government or governments (international waters) should have control. It is apparent that uniformity of local, national, or international fishing laws or regulations is essential for the preservation and the proper utilization of the fisheries resources of many waters. The possibilities of proper control and proper utilization of a fishery or sea resource are often apparent. Outstanding in this regard are the results that have followed the operation of the Pacific Halibut Treaty between Canada and the United States, and the Pelagic Sealing Treaty between the United States, Great Britain, Japan, and the Union of Socialist Soviet Republics. Fishery regulations in general, including uniformity where uniformity is desirable, should be based on proper practical and scientific knowledge. The gathering of such knowledge should be promoted by the administrative agencies and other interests concerned directly or indirectly in the welfare of the fishery involved, and should be undertaken as speedily as may be feasible by the government or governments responsible for the proper utilization and the perpetuation of fisheries resources.
  2. *Propagation and Distribution.* The responsible agency (state, provincial, dominion, federal) should formulate the stocking policy, should assume leadership in cooperative undertakings, should receive from all cooperating agencies all applications, requisitions, or plans for stocking fish or other aquatic forms of life to prevent duplication of plantings, should distribute the applications to the cooperating agencies and arrange for exchange of eggs and fish between agencies to reduce the travel and expenses in the distribution of the hatchery output, and should coordinate any other activities of the cooperating agencies wherever duplication of effort can be eliminated and expenses reduced. On international, inter-provincial, interstate, and other waters where joint responsibility exists, an agreement should be reached concerning the stocking policy and rigidly adhered to by the responsible agencies.
  3. *Investigations (Surveys and Researches).* Federal investigations of the fisheries should emphasize fundamental problems that have the widest geographical application in the scientific administration of the fisheries, whereas state research should emphasize the solution of the many specific problems of local significance. There should at all times be close cooperation in fisheries research between the various states, provinces, and federal governments, and a coordination of research so that all duplication of work may be reduced to a minimum. The following research projects illustrate the types especially suited for federal prosecution:

    - a. Biological, statistical, and technical investigations and surveys of the commercial fisheries of boundary waters.
    - b. Research on the improvement of commercial fisheries gear and of processing methods, and the development of new fisheries products.
    - c. Economic surveys on the grading, marketing, and distribution of fish and fisheries products.
    - d. Research on the migratory species of game fish in boundary waters.

- e. Research on type waters and the ecology of their game fish for the purpose of formulating broad principles governing the suitability of the various types of waters to particular species of fish.
  - f. Fundamental research on the causes, control, and prevention of fish diseases.
  - g. Research on pollution to establish standards of water suitability favorable for fish and other aquatic forms of life.
4. *Exchange of Research Data.* In order to assure close cooperation in fisheries research between the various states, provinces, and federal departments, coordination of research, and the reduction of duplication of research to a minimum, there must be a free exchange of scientific programs and data. A central agency to disseminate information on all phases of fisheries research, fish culture, fisheries management, pollution, etc., should be established, preferably in the U. S. Bureau of Fisheries at Washington, D. C., and in the Dominion Department of Fisheries at Ottawa, Canada. Each state and province should then send to this central agency copies of all published and mimeographed reports on the progress or results of its research, and of any proposed program of research.

## II. OBJECTIVES OF FISHERIES ADMINISTRATION AND MANAGEMENT.

1. *Planning Boards and Priority Rights of the Fisheries.* The federal, dominion, state, provincial, and regional planning boards should consider the fishery resources as a very important element of national wealth and not as a minor incident in the development of power, flood control, drainage, irrigation, reclamation, and recreational projects, as has been done in the past. The planning boards should recognize wherever possible the principle of prior right for the fisheries. Only when a proposed water development exceeds in public value the fisheries resource, should the latter be sacrificed, in which case the fishery interests should be compensated fully for their losses. The fisheries should be given equality of representation on all planning agencies at all times and should be represented by qualified persons from the state, provincial, and federal agencies involved.
2. *Public Ownership and Fishing Rights.* Public ownership of lands based on fishing waters, as well as on forestry, game, watershed, parks and recreation, should be recognized as essential to the public welfare in its preservation of public fishing. Lands purchased primarily for public fishing should be made available for other public services not detrimental to fishing. Lands adjacent to waters already held in trust for the public should be used for public fishing when such use is not inconsistent with the purpose for which the lands were purchased and are now held. Any conveyance of title from any public agency to private ownership should contain a reservation of public rights in any fisheries that may be involved. Public rights should be recovered by long-term leases or otherwise when possible in waters or shores that have been appropriated for private or corporate uses and that cannot or should not be purchased. Fishing rights or leases of land should be acquired with the understanding that any improvements or construction work may be carried out to guarantee a maximum return in public fishing. Restrictions or easements by prior owners which would prove detrimental to the development and enjoyment of public fishing waters should be avoided in purchasing or leasing lands or fishing rights.
3. *Personnel Training Facilities.* It should be recognized that successful fisheries administration and management require personnel well trained in the scientific approach and in fact-finding. The study of the fisheries should be developed as a profession equivalent to forestry and agricul-

ture. The facilities for training men in the fisheries are inadequate to meet the present varied requirements. The many divisions and subdivisions of the field and the specific requirements of each must be fully recognized. There must be practical fish-culturists and investigators of fish-cultural problems. Among the latter some will wish training in the special fields of fish pathology, nutrition, breeding, statistical analysis, and fish-cultural mechanics. Provision must be made for practical management of public waters in the interests of sportsmen, commercial fishermen, and the broader conservationists. Many complicated problems are involved here that require the attention of specially trained investigators and administrators. To meet the present situation, as well as to provide for future contingencies, it would seem desirable to encourage:

- a. The further development of fisheries work in those institutions of learning which have already initiated such a program.
  - b. The establishment in our universities of courses in fish culture, fisheries management, and fisheries biology. The more fundamental courses—prerequisite thereto are now quite generally included in university curricula.
  - c. The introduction of short courses a year or two in length in which students may prepare themselves for the more practical phases of fisheries work, and in which practical fisheries workers may become acquainted with the latest discoveries and developments in the field.
  - d. The development of facilities through which the students of fisheries work may secure practical experience in fish culture, fisheries management, fisheries conservation, etc. Federal, provincial, and state agencies should be induced to give summer employment to fisheries students in hatcheries, on biological surveys, and in stream- and lake-improvement work. Every student in fisheries should serve an apprenticeship in practical operations, and every scientist who expects to enter the field of fisheries investigations should secure the practical point of view by engaging in active fisheries operations.
4. *Political Interference.* The administration of the fisheries resources should be completely divorced from political influence by providing:
- a. Freedom from political pressure in the appointment and direction of the supervisory and other personnel, and the establishment of such tenure of office that will bring security, promotions based on merit of services, and compensation adequate to attract well-qualified officers and other employees.
  - b. Authority not subject to political pressure within a department, commission, or other agency, to establish policies, with powers to put those policies into effect.
  - c. Public hearings on regulations and other matters affecting the use of fisheries resources, and the power to appeal from local officers' rulings so that a definite opportunity for presenting facts is provided, with a resulting reduction in the necessity and value of political influence.
- The proposals for a non-political commission for the administration of conservation resources, as embodied in the "MODEL LAW" adopted by the International Association of Game, Fish and Conservation Commissioners in September, 1934, are endorsed as the best means of accomplishing the divorcement of fisheries administration and politics in the United States.
5. *Funds.* Since the general public profits by public fishing, both sport and commercial, funds should be appropriated from general taxes to supplement the monies collected through license fees. All monies collected through penalties assessed and seizures made for violations of

the conservation laws should revert to the conservation fund to be used exclusively for conservation activities. Private funds should be solicited for research and education.

6. **Cooperation.** It is essential that the controlling agency maintain close cooperation and collaboration with and between owners of private waters, sportsmen, commercial fishermen, educational institutions, institutes, experiment stations, and the various branches of government in matters that affect fish production, management of fishing waters, and fishing laws.
7. **Education and Publicity.** Since an enlightened public leads to sound conservation laws and the rigorous observance of these laws, every avenue of approach to the public mind should be utilized in making available the most recent authoritative information on conservation matters. Knowledge of the fisheries may be disseminated by means of:
  - a. Organized associations and publicity bureaus.
  - b. Public addresses and discussions on the platform and through the radio.
  - c. Newspaper and magazine articles.
  - d. Motion pictures in theatres and elsewhere.
  - e. Small pamphlets and leaflets.
  - f. Essay contests in schools.
  - g. Establishment of courses in conservation based on well-prepared texts written for the schools of various grades.
8. **Fish as Crops.** It should be recognized that fish should be handled as crops, and that our fishing waters, like our farm lands, possess variable potential capacities for production and must be harvested intelligently in order to provide an abundant or satisfactory yield each year. In order to safeguard good fishing from year to year it would be advisable to leave an ample supply of stock or seed in the lakes and streams and not depend entirely on artificial propagation. The factors that control the annual production of fish are not thoroughly understood at the present time and need to be analyzed by more intensive research if the waters are to be utilized to their fullest capacities.
9. **Private Propagation.** The construction of private rearing ponds and hatcheries for commercial purposes should be encouraged. All such enterprises should be regulated under state or provincial license, the fees not to exceed the amount required to pay for inspection, technical advice involving such problems as disease, parasites, mortality, and nutrition, and the overhead charges involved.
 

Experimental work should be carried on to determine whether fish and other aquatic forms of life can be raised successfully as crops by farmers, either as part-time or full-time work.
10. **Management of Fishing Waters.** Fish management requires a balanced fisheries program that may involve a careful study or adjustment of any or all of the following factors of production or abundance: legal restrictions, enforcement, propagation, environmental control, introduction of exotic fish, food, predator control, control of disease and parasites, and nurseries and refuges. In addition, intelligent management requires accurate statistics of yield and a good knowledge of the natural history and life history, particularly age, growth and survival data, not only of the game and commercial species of fish but also of the predators or obnoxious and forage fish. Since *soil erosion, reforestation, drainage, flood control, water restoration, and impoundment of waters* are now recognized as tremendously important factors in fish production, the closest contact should be maintained between fisheries officials and the agencies responsible for these various activities.

### III. OBJECTIVES OF FISHERIES RESEARCH.

1. *Lake and Stream Surveys and Improvements.* Proper stocking and improvement of our lakes and streams depend upon an adequate survey of these waters. Until the fundamental physical, chemical, biological, and economic factors are determined by qualified fishery biologists, a sound basis for fish plantings and environmental improvements, as well as other phases of fisheries management, is lacking. It may well be made a cardinal principle in the management of any waters to assume that until fish cultural and fish-betterment procedures have been definitely shown by accurate and adequate data to be effective, they should be regarded as of doubtful value.

The surveys should include:

- a. A rapid, comprehensive inventory of all of the fishing waters in the state or province, preferably by watersheds.
- b. Intensive studies over a period of years of a number of lakes and streams representative of the waters in the state or province.

The main purpose of a general survey is to answer the following questions about each lake and stream:

- a. What species will most likely find conditions suitable for maintenance, growth, and reproduction?
- b. Is the water in need of stocking in order to utilize fully the food resources and maintain the densest population consistent with normal growth and maximum productivity?
- c. What size fish should be planted in the expectation of giving the desired results?
- d. What, if anything, aside from restocking should be done to make the stream or lake more productive?

Intensive, long-time research on type waters is necessary in order to apply fully the data collected in the general survey and to indicate desirable changes in the preliminary management plans as outlined for each water. However, it is recognized that each lake and stream constitutes an individual problem to which the results of type studies cannot always be applied without modification.

Improving the environment for fish in our lakes and streams is now a recognized phase of fishery management. The purpose should be to alter these waters so that they will support more fish and furnish more fishing. The major stipulations that should be followed in all lake and stream improvement work are:

- a. An adequate survey should be made to determine the abundance of fish and the factors that limit fish production.
- b. A plan for improvement should be prepared by a fisheries biologist with experience in construction work or with engineering advice.
- c. The installation of devices or other alterations of the environment should be done under the direct or advisory supervision of this fisheries biologist.
- d. Checks of the work should be made annually if possible to determine its biological value and to effect necessary repairs and alterations in the structures.

The biological phase of improvement work should receive consideration equal to, if not greater than, the engineering. Well-constructed devices may effect no improvement; poorly-built structures, though they may be biologically efficient, are temporary. Of primary importance is the retention of natural appearances. Where a choice exists between some artificiality and poor fishing, the former is preferable.

2. *Fishways and Screens.* With the recent development of gigantic flood-

control and extensive water-restoration projects, the problem of fish migration has received new impetus and added significance which justifies a considerable expansion of the present research facilities to provide more effective, practical fishways and screens.

### 3. *Statistics.*

- a. *Sport Fisheries.* Inventories should be made of the abundance and kind of fish available to the angler and of the catch and kind of fish taken annually by the fishermen. Special attention should be given to a determination of the abundance and kind of fish in type waters. Total annual yield of type waters should be obtained by an intensive creel census, preferably over a period of years. This census should be taken by trained individuals to assure accuracy and completeness, should be taken every day of the fishing season, and should include all of the fishing on the waters studied. In addition to the intensive census on type waters, a general census representing a random sampling should be taken over the entire state or province or district, to determine the nature of the fishing and especially the trend of the catch from year to year. The use of uniform methods of taking the census and in compiling the data should be encouraged to permit comparison of the information gathered in various areas by various agencies. A study might well be made of the preferences of the anglers with respect to species of fish by the use of questionnaires or of a stub attached to the fishing license.
  - b. *Commercial Fisheries.* The statistics of the production of commercial fisheries may offer some clue to the abundance of the stock, but cannot provide a precise measure of abundance. Abundance can be determined accurately only in terms of production in relation to fishing effort, that is, production per unit of effort. The statistics of the commercial fisheries should therefore include complete data on the fishing effort that led to the production of the recorded catch. Continued attention should be given to the development of satisfactory methods for the analysis of commercial fisheries statistics.
4. *Improvements in Fish-cultural Methods.* It is believed that improvements in fish cultural methods, including such items as nutrition, selective breeding, and disease control, are greatly needed and are most likely to result from experimental studies directed and conducted by persons specially trained in research methods, in fact, by those who know how to conduct experiments by approved methods and who are well enough informed to interpret and evaluate results correctly. If experimental results are to have any value in fish-cultural practice, they must also be interpreted to fish-culturists who in turn must be able to apply them to large-scale operations. The investigator is trained to experiment and to interpret results. The fish-culturist is trained in the work of producing fish. Both are specialists in their respective fields, but each is dependent upon the other in the achievement of the original objective. Consequently, closer cooperation and collaboration between these two groups than past history reveals is necessary. The ideal arrangement would seem to be a Fish-cultural Experiment Station having a research staff for developing and testing new ideas and an operating staff of fish-culturists for putting them into practice. The research staff would be provided with laboratory facilities for conducting research in all fields embracing fish culture, including pathology, disease control, nutrition, genetics, and selective breeding. The fish-culturists would have hatchery and pond facilities for fairly large-scale operations with both cold- and warm-water fishes.
5. *Stocking Policies and Standards.* Stocking policies should be determined to a large extent by surveys as discussed under Section III, Sub-



section 1. These policies should be modified from time to time in accordance with the results of:

- a. Intensive studies of type waters.
- b. Observations on the results of management and of catch in individual waters.

The stocking policy for each lake or stream should specify:

- a. Species of fish which should be introduced or encouraged by artificial plantings.
- b. Approximate number of fish required (as near as can be determined) to maintain maximum fishing consistent with food supply and fishing intensity.
- c. Proper size or age of fish to be planted to produce best results.
- d. Parts of each lake or stream best adapted to receive the plantings.
- e. Proper time of year for plantings.
- f. Local improvements or regulations needed to protect adequately the fish planted.

Unless investigations should suggest otherwise, the following standards should be adhered to:

- a. No introductions of exotic species of fish should be made in the waters that now contain only native species which provide good fishing.
- b. Plantings of exotics should be made or continued in barren waters, in waters where no game fish are found, and in waters where exotic species are best suited to the environment and have proven to be of higher value for fishing purposes than native species. In all other waters the native species should be encouraged.
- c. Planting should be discontinued in waters where the introduction of exotic species threatens extinction of the native species in an entire area, and every effort should be made to restore the native species to its normal status.
- d. The number of any species of native non-game fish should not be reduced unless such reduction is in the interest of better fishing.
- e. No effort should be made to introduce exotic fish merely for the purpose of increasing the variety of game fish.
- f. All stocking should be planned with adequate consideration of possible effects on contiguous waters within the possible limits of migration of the planted fish. Plantings in private waters which may affect public waters should be rigidly controlled.
- g. The allocation to and actual planting of fish by a well-trained personnel familiar with individual stream and lake requirements should replace the "application system" to eliminate unwise and wasteful plantings, overstocking in locally favored waters, and the neglect of other waters not so favored.
- h. Fish produced by public funds should be distributed to waters open to public fishing only, leaving the stocking of private waters to private enterprise.
- i. Only sound and healthy fish should be planted in public or private waters to prevent the danger of spreading diseases and parasites.
- j. Accurate records of the number, length and weight of each species planted each year and of the exact points or sections planted should be kept for each lake and stream. These records should be kept in the permanent files of the hatchery and of the department concerned.

Even though the above standards relative to the introduction of exotic species of fish are acceptable, the "foreign fish" problem still requires much more study. The possible advantage of utilizing stock from adjacent waters rather than from distant regions, the effect on the native game fish of the introduction of a new and hardy stock, and the feasibility of introducing new forage fish into a lake or stream are

some problems that may be studied with profit. It would also be extremely valuable in guiding the present and future fish-cultural activities if all of the available information on the successful and unsuccessful introductions of fish could be compiled, with the data arranged by species to show clearly the failures, successes, advantages, and disadvantages of each introduction. Such compilation could probably be done best by a special committee appointed by the President of the American Fisheries Society.

6. *Natural and Artificial Propagation.* The relative values of natural and artificial propagation should be determined for each major species of fish in various types of waters. This most fundamental of all fisheries problems presents the greatest challenge that confronts the fisheries scientist and the conscientious fish-culturist. Upon its solution, which has already been delayed far too long, rests the future direction of our fish-cultural activities. Considerable evidence has already appeared which indicates the relative insignificance and futility of artificial propagation of certain commercial species. It is therefore imperative that a greatly expanded research be concentrated on this problem at once.
7. *Nurseries and Refuges.* Whether, where, when, and how nurseries and refuges should be established are questions that cannot be answered definitely for all regions. More research is needed to determine the most efficient and economic types of nurseries (hatchery ponds, field stations) to be used under varying conditions. Investigations should also determine when refuges should be established to protect spawning fish, young and immature fish as in feeder streams, or an entire population in a lake or in sections of a stream.
8. *Life and Natural Histories.* It is obvious that in order to manage intelligently any crop of fish, the habits, reactions, growth rate, spawning age, etc., of the fish must be known. Since the life history of a species may vary considerably with the different waters, every opportunity should be employed to obtain at least the more critical data for every important lake and stream.
9. *Predator Control.* Practical observations and scientific research have demonstrated the necessity for the control of fish predators in the immediate vicinity of hatcheries and rearing stations. Research is needed to provide practical methods of driving off predators, particularly birds, and to prevent predation by means other than the killing of predators. Need for the control of fish predators (mammals, birds, reptiles, and fish) in public waters depends largely upon local conditions; and control is justified only when scientific research has demonstrated that actual damage to desirable fish populations is occurring. The indiscriminate, wholesale slaughter of fish-eating birds should not be permitted.

Further research should be carried out on the management of the beaver, which, although not a predator, may cause unfavorable conditions for fish life and require control in certain waters. Research is particularly imperative in determining the actual damage that is done to fish in lakes and streams by the so-called noxious fishes (gar pike, bowfin, carp). It is recognized that under certain conditions and at certain seasons of the year some control may be necessary. It is not generally recognized, at least in practice, that under some conditions fish predators may be harmless or actually beneficial by preventing overpopulation of the less desirable species or even of the desirable fish and that predators may be a very essential factor not only in maintaining the balance of nature but also in preventing the stunting of growth of the desirable species of fish. The possibility should not be overlooked that in some

- cases at least the fish taken by predators are the weak and diseased individuals and that their removal benefits the stock.
10. *Parasites and Diseases.* Notwithstanding the high quality and the increase in the amount of work undertaken by students of fish diseases during the past fifteen years, there is still need for additional effort in this field. Fish-culturists continue to be handicapped by abnormal losses of fish for want of specific and reliable information as to their prevention. Variation in the quality of the water, in the condition of the fish, and in numerous other factors often upsets calculations and renders useless our most cherished procedures. To the end that we may have a more definite knowledge concerning fish diseases and more reliable methods of control applicable to all hatcheries, we urge:
    - a. A greater interest among specialists of our universities and governmental services in the study of fish diseases and methods of their elimination.
    - b. A closer and more sympathetic relationship between the fish-culturist and the researcher such as is evidenced by the recently established "disease service" in the U. S. Bureau of Fisheries.
    - c. A closer cooperation between state or provincial conservation departments and research institutions, especially state universities.
    - d. A more concentrated study on the control and prevention of the most destructive diseases in our hatcheries, such as furunculosis.
    - e. A re-examination of our methods of disease control by a group made up of experienced fish-culturists and fish-pathologists, and the preparation of a series of tests by this group in various hatcheries for the purpose of standardizing the methods.
  11. *Forage Fishes.* It is recognized that forage fishes may constitute an extremely important factor in the success of fishing waters and that the tendency in the past has been to permit their partial extermination in many of our inland waters by bait dealers and fishermen. To remedy the situation the following recommendations are made:
    - a. That state and provincial departments regulate more strictly than in the past the capture and sale of bait minnows.
    - b. That more studies on the life history, habits, food, reproduction, enemies, etc., of forage fishes be encouraged.
    - c. That investigations be conducted relative to the propagation, methods of holding, and the control of diseases of our forage fishes for the purpose of developing a reliable cultural procedure.
    - d. That suitable forage minnows be propagated by state and provincial hatcheries for distribution in depleted waters.
  12. *Mussels, Oysters, Sponges, and Other Non-fish Water Resources.* It is recognized that the waters produce valuable products other than fish and that many of these have received very scant attention from conservation administrators and scientific investigators. It is believed that greater recognition than is accorded at present should be given the conservation of at least some of these non-fish water products by a study of their abundance, life history, habits, culture, protection, etc.
  13. *Commercial Fisheries Gear and Products.* The experimental study of the action of the various types of commercial fishing gear on the various species of fish, and the reaction of these fish to the various types of gear, is an important research objective. Commercial fishing is probably the only factor involved in the abundance of the food fishes that can be placed under the immediate control of man. The oceans, the Great Lakes, and the large interior lakes of Canada, the principal sources of our food fishes, are too large to be subjected to environmental control. The effectiveness of artificial propagation is still a

subject for debate. Since the balance between mortality and replacement must be controlled largely by the regulation of fishing operations or gear, it is very important that many more data be collected on the selectivity of fishing gear so that the production can be controlled intelligently without undue hardship to the fishing industry and to the fishermen. Recent experiments with various types of nets on the Great Lakes and on the Atlantic Ocean have shown conclusively that by the introduction of certain modifications in the building of nets much can be done to reduce the wastage and destruction of immature or small fish.

More research should be carried on to improve and prolong the life of the materials used in the building of fishing gear and thus save the industry thousands of dollars each year. Greater progress should be demanded also in the investigation of the grading, marketing, and distribution of fish and fisheries products and in the development of new products and processing methods.

14. *Publications.* With the rapid expansion of fisheries research there has developed urgent need for additional facilities and funds for the prompt publication of the results of investigations. The value of many excellent and costly researches and surveys has been lost and duplication of effort has resulted because "funds were not available for publication."

#### IV. ESSENTIALS OF A POLLUTION POLICY.

All efforts to propagate fish and develop other aquatic resources necessitate water unaffected by destructive pollution. Pollution control should include the headwaters and tributary waters to cover the stream drainage as a whole and not be limited to lower waters and large sources of contamination. The elimination of pollution becomes a primary necessity in any fisheries program. Adequate pollution control requires:

1. A legal basis for pollution control considering all water resources.
2. A recognition of biological values in water resources as well as public health and industrial, municipal and property values.
3. Technical information with reference to the effects of pollution on the fisheries, as well as on public health, as a basis for control action. This necessitates thorough studies by qualified fisheries biologists as of equal importance with investigations from the standpoint of public health.
4. A coordination of federal or dominion interests, as having jurisdiction over coastal, navigable, and interstate or inter-provincial waters, with those of states, provinces, and individuals.
5. Continued research on the effect of pollution, methods of elimination of pollution, and methods of treatment and utilization of waste products; to be followed by demonstrations of methods determined by such research.
6. The development of a public understanding of the scope, importance, and necessity for pollution control to accomplish stream and lake sanitation, to permit the growth of desirable fish, and to enhance property values.

#### V. DISCRETIONARY POWERS.

Many states have incorporated in their conservation laws a provision that gives those commissioners or directors who are charged with the duties of protecting fish, birds, game, and other wildlife the power to regulate the time and manner of taking fish and game. It is believed that in the best interest of conservation such discretionary power should be vested in the conservation commissioners or directors of every state and province, and of the federal bureaus charged with the enforcement of federal laws, and should be made applicable to both sport and commercial fisheries. In some states the commercial fisheries have been specifically exempted from the

application of the discretionary power act. Nevertheless, effective management of the commercial fisheries requires the same elasticity in regulation that is necessary in any sound conservation program for game fish. Any discretionary power granted to govern the commercial fisheries should, however, be so circumscribed as to safeguard the fishing industry from any violent upsets or radical measures. The immediate effects of any regulation on the industry must always be given careful consideration.

#### VI. STANDARDIZATION OF COMMON NAMES OF FISHES.

The importance of standardizing the common names of fishes is reflected in the action of the American Fisheries Society in establishing in 1932 a special committee to prepare for adoption an official list of standard common names to correspond to the accepted scientific names. The policy adopted by the committee and published on page 27 of the 1935 Transactions (Volume 65) needs no further elaboration here.

#### VII. COMPILATION AND SUMMARIZATION OF FISHERIES DATA.

Sub-committees should be appointed by the President of the American Fisheries Society to correlate and summarize at irregular intervals the most recent data and information on various fisheries and pollution problems and to outline methods of research.

#### NORTH AMERICAN FISH POLICY COMMITTEE

E. L. Wickliff, *Chairman*, Ohio

J. D. Chalk, North Carolina  
H. S. Davis, Washington, D. C.  
George C. Embody, New York  
Fred J. Foster, Washington  
Charles A. French, Pennsylvania  
Seth Gordon, Pennsylvania  
Wm. J. K. Harkness, Ontario

A. S. Hazzard, Michigan  
Carl L. Hubbs, Michigan  
A. G. Huntsman, Canada  
S. B. Locke, Illinois  
James A. Rodd, Canada  
John Van Oosten, Michigan  
Geo. C. Warren, Jr., New Jersey

**THE PRESIDENT:** Thank you, Mr. Wickliff, and your boiling-down committee, for your fine contribution to the Society. Your motion to adopt the Policy subject to the revision of the Society, if met with a second, will be put to the Society.

**MR. B. M. BRENNAN:** I would like to second Mr. Wickliff's motion.

**THE PRESIDENT:** Is there any question concerning the motion to adopt the report? If not, all in favor say "aye." Contrary, "no." The motion is carried.

**THE SECRETARY:** One of the questions that comes up at this particular time is whether it is desirable to continue the Committee. My own feeling, Mr. President and members, is that it might be wise to continue the Committee, at least for another year or two, because there may develop a need for further revision of certain phases of the Policy. We did that when the American Game Policy was adopted in 1930. We continued that Committee as a part of the Game Conference for several years after the policy it formulated was actually adopted, in order that that Committee might take charge of the job of bringing in suggested revisions. The way it worked out was that it was largely the committee's duty to call attention to the progress that had been made in applying the policy, rather than bringing in amendments to it.

**THE PRESIDENT:** The President will entertain a motion to continue the Fish Policy Committee. I think we can do that only for another year at this time. What is the pleasure of the Society?

**THE SECRETARY:** Subject to such alterations as the President-Elect and the Chairman may agree upon.

**THE PRESIDENT:** I think that is understood—subject to any alterations that the Nominating Committee may see fit to make.

**MR. P. J. HOFFMASTER** (Michigan): I move you that the Committee be continued for one year.

**MR. FRED J. FOSTER** (Washington): I second the motion.  
(The motion was voted upon and carried.)

**DR. H. J. DEASON:** Before we proceed I believe the Society should express its appreciation to Mr. Wickliff and to the members of his Committee for the excellent work they have done in preparing this American Fish Policy for us.  
(The motion was seconded, voted upon, and unanimously carried.)

**THE PRESIDENT:** Again, thank you, Mr. Wickliff, and your associates, for your work.

#### APPOINTMENT OF COMMITTEES

**Auditing**—A. D. Aldrich, Oklahoma, *Chairman*; Albert Powell, Maryland; P. J. Hoffmaster, Michigan.

**Resolutions**—Herbert C. Davis, California, *Chairman*; Charles E. Jackson, Washington, D. C.; V. M. Simmons, Indiana; H. H. MacKay, Ontario, Canada; E. L. Wickliff, Ohio.

**Nominations**—P. J. Hoffmaster, Michigan, *Chairman*; Eugene W. Surber, West Virginia; H. S. Davis, Washington, D. C.; H. S. Swingle, Alabama; Charles O. Hayford, New Jersey.

**Time and Place**—B. M. Brennan, Washington, *Chairman*; James Brown, Kentucky; John W. Scott, Wyoming; Russell Hunter, Vermont; James A. Rodd, Ottawa, Canada.

**Publications**—Following the 68th Annual Meeting, President-Elect Foster appointed Dr. Ralph Hile, Ann Arbor, Mich., to the Committee on Publications for a term of five years, to succeed Dr. John R. Greeley, Albany, N. Y., whose term had expired. Doctor Van Oosten was persuaded to accept the chairmanship of the Committee for another year, which now consists of the following:

<i>Committee</i>	<i>Term Expires*</i>
Dr. Ralph Hile, Ann Arbor, Mich. ....	1943
Dr. Lauren R. Donaldson, Seattle, Wash. ....	1942
Dr. Paul R. Needham, Palo Alto, Calif. ....	1941
Dr. John Van Oosten, <i>Chairman</i> , Ann Arbor, Mich. ....	1940
Prof. W. J. K. Harkness, Toronto, Canada .....	1939

## REPORTS OF COMMITTEES

### AUDITING COMMITTEE

**MR. A. D. ALDRICH:** Your Auditing Committee has checked the books of the Society, also the supporting vouchers, for the period July 1, 1937, to June 15, 1938, and finds the report as submitted to be correct. This Committee recommends that the appropriation for clerical and stenographic services for the fiscal

\*Indicates the annual meeting at which the term of each member of the Committee will expire.