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## Research vs. Conservation

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*Iowa Conservation Commission*

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## RESEARCH vs. CONSERVATION

W. W. AITKEN

Conservation defined, means to supervise and protect. The supervising and protecting of wild life requires a knowledge of life history, habits, and daily activity of the particular objects under observation. This information is only gained after study and research into all factors effecting the life of plant and animal.

At the present time, research workers in Iowa are making studies of ducks, pheasants, quail, muskrats, insects, plants, etc., for their scientific, economic and recreational value. Important contributions have been made in the past and valuable work is, at the present time, being pursued, yet numerous unanswered problems in all fields need further attention. The information gained by the research worker today finds practical application and becomes a direct benefit to the conservation of wild life. Inasmuch as scientific study has proven merits in the study of game, attention is particularly directed at this time to fish and their management.

Wide variants of fish ecology are exhibited in Iowa as a classification of state waters reveals. There are a gamut of gradations in stream and lake characters. Northeast Iowa has cold trout waters. The upper mid-state has rock-bottomed small-mouthed bass environment. Southwest Iowa has turbid catfish streams. Iowa lakes range from shallow bullhead areas, pan fish and bass sections, to the sport fishing, pelagic Okoboji, each body of water demanding individual treatment in stocking, in improvement, and in management.

These natural sequences establish a variety of propagation problems, Iowa fish culturists care for trough of brook and rainbow trout, batteries of yellow pike-perch, raceways of artificially fed small-mouthed bass, and pond units of bullhead, bluegill, crappie, and large-mouthed bass, each group of fish requiring differed methods of daily supervision and management.

The various types of fishing areas, with their specific biotic factors, state wide increase in fishing interest, the lake building and restoration impetus of the 25-Year Conservation Plan, the probability of a diminishing supply of stock from the canalized Mississippi, the lower water levels in the state, the correlation of fisheries improvement with waterfowl management, all coupled

with limited faunal and ecological history necessitate the placing of a fish management plan on a fundamental basis.

For these reasons, the basic factors in such a plan<sup>1</sup> are fused into a working plan that is practical, scientific, and therefore reasonable. To give research workers a picture of the State fisheries plan the different phases are here enumerated.

*Propagation:* The propagation of fish includes trout and pike-perch hatcheries, pan fish, bullhead, bass, and forage minnow ponds; nursery lakes that are certain small lakes where fry are introduced and fingerling periodically removed to regular fishing areas; sportsmen's ponds where local groups, under State supervision, produce fish for local waters.

*Collection:* The collection of game fish from land-locked ponds in the flood plains of inland and border streams and their return to suitable fishing waters.

*Rescue:* The wholesale rescue of fish by Federal, State, and sportsmen's groups from land-locked pools in flooded districts and their return to mother waters or their use for stocking barren waters.

*Stocking:* The stocking by State and U. S. Bureau of Fisheries of State owned lakes and privately owned areas, the stocking of rivers, smaller streams and reservoirs.

*Obnoxious Fish Control:* The removal of carp, gar, dogfish, and other rough fish from game fish waters, by Department crews, by contract, by relief labor under a state wide W. P. A. project, by gill-netting through the ice, and by sportsmen's groups.

*Winter Aeration:* The mechanical and natural oxygenation of the shallow lakes that experience unusual oxygen depletion during the winter months. The work is pursued by the Department, by W. P. A. projects and by sportsmen.

*Improvement:* Streams—major activities are erosion control and reforestation of watershed, tree planting of stream banks, the elimination of pollution directed by the State Board of Health, the installation of devices and dams by State, Federal Governments and sportsmen's groups. Lakes—the reconditioning of natural lakes by restoring natural shore lines by excluding cattle and all agricultural practices from the immediate lake area, the introduction of suitable aquatic vegetation, the stabilization of levels by controlled inlets and outlets, the control of rough fish, planned stocking correlated with creel limits, and a dredging program of distinctive proportions. Artificial lakes—the building of fishing

<sup>1</sup> Aitken, W. W., Feb. 1936. Iowa Fish Management Plan; North American Wildlife Conference, Washington, D. C.

lakes. Lake Wapello, a typical example of fish management, with its lake bed prepared with fish shelters of rock and brush, and spawning areas of tile, gravel, and sand, aquatic vegetation plantings for fish and waterfowl, scheduled stockings and service facilities provided for the recreator, City and leased reservoirs, and an improvement program outlined for municipal execution that approximates artificial lake development.

*Acquisition:* The securing of trespass waivers along privately owned streams, access agreement for public use of deserted railroad reservoirs; the purchase of riparian rights along State lakes and the acquisition of areas suitable for pond propagation units.

*Surveys:* Physical surveys by engineers of lake bed contours, and watershed topos, including geological data and wind and precipitation phenomena; biological surveys of aquatic fauna including records of biotic and chemical conditions, creel census of water stocked and the reconnoissance of streams and lakes for future improvement.

*Biological:* The initiation of fundamental ecological studies with emphasis on fish distribution and controlling increments; the dissemination of information to fish and game workers that are not scientifically trained; and the correlation of private and State scientific research work with pertinent fish problems.

It is only presumed here to give a brief account of the conservation of fish in Iowa so that state research workers may have a definite picture of present day ichthyological needs. Here are a few problems that need urgent consideration.

Propagation is a basic factor in Iowa fish management. Of paramount interest in this field are the respective merits of raw, cooked, and natural foods; value and types of aquatic vegetation best suited for fish ponds; spawning habits of fish; growth rate studies of young fish; the chemical condition of the water that regulates optimum life cycles; and physiological and pathological investigations.

The stocking of Iowa waters to replenish the fisherman's take is a major activity of the Conservation Commission. Field studies that may answer perplexing questions in stocking are those of fish populations, and inventory of fish foods, such as entomostracean, crustacean, smaller zoo-plankton forms and animal-plant food chains, the effects of dams on migration, the effect of different types of pollution on related aquatic fauna, parasites and their life histories in relation to fish, the life histories of fish, food cycles and their limiting factors, carrying capacities of water areas,

zonal relation of plant and animal as well as the zonal relation between plant and plant, and animal and animal.

Rough fish control has been inherited through over-zealous stocking of obnoxious species in earlier years. Studies need to be made of carp and their environmental requirements, and the harm these fish do to game fish lakes. Studies also need be made concerning the relation and value young obnoxious fish have as forage for game fish, and the food habits of buffalo and the age and size at which buffalo and carp experience diminishing fecundity. The damage carp do to spawning areas of game fish, and their oxygen requirements, as well as their tolerance to polluted water, requires recorded observations. These are just a few problems of present interest in Iowa pertaining to rough fish.

The aeration of lakes in winter needs biological investigation. Value of plants as oxygenators at different seasons, as well as further knowledge of aquatic plant ecology, is necessary. Study should be made of lakes through winter months to learn oxygen fluctuations at different depths and value of certain aquatic vegetation as oxygenators under the ice, as well as other gas volumes present in lake and stream areas. Methods for introducing oxygen in the water at such times, and the effect such efforts have on fish and other aquatic life is worthy of study. Survival of fish at different ages and the effect of light intensities on their feeding habits is unknown.

Knowledge of fish movement and its correlation to seasons, temperature, and temperature changes has practical value in controlling rough fish, and in managing game fish. The migration of fish to spawning areas and the capacities of such areas are scarcely known. Information along these lines is of vital interest to fisheries workers.

Improvement of lakes and streams present a rich field for study. Effects of lake bed improvement, trout stream improvement, and the design of new and better devices to restore finshing areas are of vital interest to the fishing public as well as to State and Federal agencies spending the money for such improvements. Food studies as well as carrying capacities of streams and the ecological value of improvements are eagerly sought by pisciculturists. The result of such studies will have ready application in the field if such observations of streams and lakes are made before and after improvement.

Anatomical studies of fish are not extensive. The relation of structure to function has an important bearing in the study of

certain phases of fish management. Histological, as well as embryological research will reveal interesting and valuable data.

Physiological investigations are limited in ichthyological fields. The effect of temperature changes on fish should be known, also to what extent temperature influences ovarial and testicular tissue development. In fact, there is scarcely a phase of fish management which does not need physiological study.

The study of fish parasitology furnishes an unlimited field for the investigator. The results of such investigation would, no doubt, prove of practical benefit to present fisheries workers. Because fish lead such a complicated life, no influencing factor can be ignored at the expense of another. Geological, chemical, botanical, zoological, in fact, all fields of scientific research can greatly assist the planning of fish management. All conditions in the environment must be noted, analyzed and evaluated to insure lasting progress.

Time prevents other than a sketchily drawn outline of these major problems of fisheries work, yet it is sincerely hoped that this brief resume will further the cause of Conservation in Iowa.

STATE BIOLOGIST,  
IOWA CONSERVATION COMMISSION.