STATUS OF WATERFOWL RESEARCH AND DEVELOPMENT IN THE SOUTHEASTERN STATES

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This paper is in the nature of stock-taking. It is an attempt to bring together and summarize information on the status of waterfowl research and development work being done by the various state game agencies and the Fish and Wildlife Service in the Southeast. It is hoped that in so doing, we may be able to see where we stand in relation to our objectives, and if necessary bring our programs back into line.

It was at the invitation and sound suggestions of H. E. Wallace, Associate Federal Aid Supervisor, U. S. Fish and Wildlife Service, that this paper was undertaken. Because of its scope and nature, it was begun with many misgivings. Necessarily, great dependence had to be placed on personnel of the various agencies concerned. In every instance, the greatest cooperation was received and any merit this paper might have is due to the efforts of those who filled out the lengthy questionnaires and answered the numerous letters. Sincere thanks are due them for their excellent assistance.

Two sets of questionnaires were used, one relating to research and one to development. These were applicable only to state activities. Information on work being done by the Fish and Wildlife Service was obtained through correspondence with the Regional Office and with field personnel. In the Service, most research work is done by the flyway biologists and other members of the Branch of Wildlife Research, often in cooperation with personnel of the Branch of Refuges.

An important part of the flyway biologists' job is organizing and setting up the mid-winter inventory, hunter bag checks, and post card surveys. In addition to analyzing the data resulting from this work, constant attempts are made to improve the methods and techniques. Other activities include inventorying and mapping habitat resources; evaluating the effects of refuges, public shooting grounds, agricultural, and engineering developments; and appraising hunting pressures. On the Texas and Louisiana coasts aerial surveys are made to determine mottled duck populations.

Though the Branch of Refuges does not engage in research activities, it does carry on studies of fundamental development work. Some of these longterm projects have given our best understanding of marsh ecology in the Southeast. Outstanding among these are the following:

Cape Romain Refuge, South Carolina

1. A ten year study of changes in a diked salt marsh.
2. Determination of management methods for brackish ponds.

Mattamuskeet Refuge, North Carolina

1. Study of the effects of various water levels, burning, grazing, and discing on different marsh types.

Savannah Refuge, Georgia

1. Study of the effects of water manipulations, burning, and cultivation on fresh river delta marsh impoundments.

St. Marks Refuge, Florida

1. Study of the ecology of Gulf coastal marsh impoundments.

Pea Island Refuge, North Carolina

1. Determination of suitable crops as supplementary food on poor sand soil.

In addition, a great deal of work has been done in determining which herbicides are best for aquatic and marsh use, and the most effective methods of application. The Branch of Refuges also has done and continues to do much waterfowl banding. Food habits studies and disease studies are done in cooperation with the Branch of Research at Patuxent.

Much waterfowl development has been accomplished by the Fish and Wildlife Service in the southeastern states. On 23 refuges totaling 1,300,000 acres, 621,000 acres are devoted primarily to waterfowl management. These 621,000 acres consist of 334,000 acres of fresh water marsh; 46,000 acres of salt water marsh; 126,000 acres located adjacent to reservoir areas; 66,000 acres of natural lakes; 15,000 acres cultivated primarily for waterfowl; and 35,000 acres of drawdown areas within impoundments. Through 1949 development costs totaled $4,298,000 and an estimated $1,000,000 has been spent on maintenance and development since then.

On these refuges, constant water levels are maintained on approximately 26,000 acres, 130,000 acres are subject to annual drawdown and the use of crops, and about 125,000 acres are considered natural water level cycle areas which produce emergent vegetation.

The control of pest plants is a great problem, and large areas of formerly good waterfowl habitat have become very low in value because of the encroachment of undesirable species. Control is being attempted through the use of herbicides applied by air and ground techniques, and by discing, burning, water level fluctuation, and the introduction of salt water.

On the whole, these refuges are successful. Since 1942, their waterfowl populations have increased about 30% This increase has been steady despite fluctuations in the continental population. Public reaction has generally ranged from acceptance to strong support, with the majority opinion being favorable.

It appears that in general the waterfowl research and development programs of the Fish and Wildlife Service in the Southeast are quite good. There are, of course, many unsolved problems which research personnel of the Service should continue to work on. Among these are questions of the extent and carrying capacity of our wintering grounds, population shifts from area to area during the winter, the amount and rate of habitat losses to agriculture, flood control, drainage and other causes, questions of mortality due to disease, predation, legal and illegal kill, crippling loss and weather, questions as to the effects of various hunting regulations, improved census and sampling techniques, and questions of physiology, food habits, and ecology.

In development, as in research, the work of the Service is still unfinished. Besides maintaining the existing refuges, new ones should be established where they are found to be necessary. Public hunting should be permitted wherever possible. New developmental and management techniques should be applied as soon as research shows them to be valuable. To sum up, the waterfowl research and developmental activities of the Service in the Southeast so far have been good, but there is no room for complacency.

Getting to state activities, it must be remembered that most such programs are relatively new. The former concensus seemed to be that waterfowl were somehow beyond the province of state game departments. Happily, that opinion is now largely on the wane, and the states are tending to do increasing amounts of waterfowl work.

Of the eleven southeastern states, seven have one active research project each, one has two active research projects, one has completed a research project, one has completed two research projects, and one is conducting some research in connection with a development project. All of these are Federal Aid projects. The primary objective of the active projects are investigation of habitat conditions, development of management techniques, and collection of kill and population data. Secondary objectives are food habits studies, life history studies, and banding studies. The completed projects were to investigate habitat conditions, gather kill and population data, study food habits, and develop management techniques.

All states having research projects reported the locating of areas for acquisition as one of the results of their projects. The second most important result was the use made of research data in making habitat developments and improvements and in recommending developments to private landowners. The third most important result is the use of research data in formulating hunting regulation recommendations. Seven states reported that collection of kill and population data is among the objectives of their research. Only four, however, reported that the results are being applied in making hunting regulations. This seems to indicate either that proper use is not being made of research results, or that adequate results are not being obtained. In either case there is room for corrective action.

Five states reported that they were satisfied with the results of their research projects, five state that their projects were too new to permit evaluation of results, and one claimed that results were only partly satisfactory and could not be applied to the desired extent. One other state, though satisfied with its research project, pointed out that it had been unable so far to apply the results to development.

The annual cost of eleven research projects ranged between $4,000 and $18,000 and averaged $7,500 each. Data from six states showed that their waterfowl research projects cost between 1% and 11% of their average annual game management budgets, and averaged 4.5%. If really worth while information is accruing from these projects, the costs are extremely reasonable and certainly constitute a modest proportion of the average game management budget. One state reported two trained men assigned to waterfowl research, the others had one trained man. All used relatively small amounts of untrained labor from time to time.

Of the ten states answering the question concerning coordination of research with other states, eight said there is no coordination and two claimed a loose coordination was achieved through the exchange of reports. As to coordination with other agencies, five states reported coordination with the Fish and Wildlife Service, one with Tennessee Valley Authority, and four no coordination with other agencies. These figures bring out a disappointing situation. In the first place, the South Atlantic Flyway Waterfowl Committee has for the past several years been trying to promote cooperation among the various states, particularly in regard to periodic inventories and population studies. Each year at the Committee meeting the need for such coordination is agreed upon, then we turn around and go our

separate ways. Somewhat the same situation prevails in the Lower Mississippi Flyway Committee. In both cases more action and less talk seem called for.

It is also rather difficult to reconcile the fact that only five of the ten reporting states claimed any coordination with the Fish and Wildlife Service, while seven state that collection of kill and population data is one of their research objectives, and only four said that their research results are being applied in formulating hunting regulations. It appears that in this respect information is being gathered and allowed to go to waste. It would be wise for all of us to critically review our research programs to determine if they are actually set up to give the information we need, and if they are, to make sure that such information is being used to the greatest advantage. In addition, most of the problems mentioned in the discussion of Federal research are quite properly state research activities too, and should be receiving our attention.

Seven of the eleven southeastern states have begun some sort of waterfowl development work. Two others plan development projects and two neither have nor plan for any development work in the near future. Of the states having development projects, four have one active project each, one has one active and one completed, one has two active and one has four active. All projects are Federal Aid, and all are relatively new, having been begun in 1945 or later. The majority is three years old or less.

Several different plans for development have been followed in setting up these projects. In fact, a single project often utilizes more than one plan of development. Of the active, completed, and planned projects mentioned above, five are in conjunction with power, navigation, or flood control reservoirs; four flood timber lands during winter; four depend on flooding of fresh water marshes; three use natural lakes and marshes; and two are impoundments of salt or brackish marsh.

As in the plan of development, each project may use several types of management. The following tabulation will show, therefore, the number of times the various methods are used, and it must be remembered that two or three may be used together on the same project. Natural water level cycles and use of natural foods are utilized on eight of the active and completed projects and two of the planned. Periodic drawdowns, using natural foods, are likewise utilized on eight of the active and completed projects and two of the planned. Annual drawdowns and cultivated crops are used on six projects. Maintaining constant water levels is practiced on two active and two planned projects. Periodic introduction of salt water is followed on one active and one planned project.

Eleven projects reported on varied in size from 1500 acres to 22,000 acres, and averaged 8350 acres. On nine of these the impounded area varied from 55 to 12,000 acres and averaged 5000. Areas under cultivation ran from 40 to 2000 acres and averaged 400. Areas improved by planting natural foods ran from 55 to 800 acres and averaged 475 acres.

Both cultivated crops and natural food plants are being used in development work. Oats and corn are the most frequently used crops, with millet buckwheat, and soybeans the second most popular. Milo, rye grass, clover, rye, fescue, peas, and wheat are also used. Of the natural food plants, wild millet and various smartweeds are the most frequently used. *Scirpus robustus,* chufas, *Najas* spp., and *Eleocharis quadrangulata* rate second. Watershield, acorns, *Scirpus californicus, Castalia flava,* and *Potamogeton* spp. are also used.

Little information was obtained on costs. In many instances land is licensed without cost by Tennessee Valley Authority or the Corps of Engineers. Where land has been purchased for waterfowl developments, the cost has varied from $5.00 to $28.00 per acre. Several states did not submit this and other cost information. Only one reported diking costs, and these were $215.00 per mile. One other reported control structure costs — one structure at $11,000. Annual crop production costs were reported to be from $900.00 to $16,000. Such cultivation was largely on a share crop basis. Annual operational costs of six projects averaged $12,000 and varied between $5,500 and $26,000. Five states reported that the average annual costs of their waterfowl development projects constituted between 0.33% and 25% of their average annual game management budget. The average percentage was 8.7, which indicates that in most states waterfowl development is a rather minor item.

Equipment used in maintenance and operation consists of bull dozers, Oliver H. G. crawler tractors, Massey Harris "44" tractors, Ferguson tractors, Ford tractors, disc plows, disc harrows, terrace plows, grain drill, cyclone seeders, planters, jeeps, small boats with outboard motors, pick-up trucks, and power sprayers.

On almost all waterfowl developments, control of undesirable vegetation is a tremendous problem. In most cases this is being met through the use of herbicides, with 2,4-D, 2,4,5-T, and ammate being used. 2,4-D is much the most popular. Other methods include discing, mowing, cutting and burning, pulling, and water fluctuation.

The various states are divided more or less evenly on the question of responsibility for preparing engineering and hydraulic data, plans, and construction drawings. Of those reporting, two stated that project leaders were responsible, two have staff engineers, one hires private engineers, and two depend on Tennessee Valley Authority or similar agencies. Most of the work is done by contract though there is an appreciable amount done by force account.

Really remarkable results are reported by those states whose projects have been in operation for a year or more. South Carolina reports 2500 to 4000 birds using areas which carried 50 to 300 prior to development. Tennessee developments carry up to 50,000 ducks and 7200 geese where there were almost no birds before development. Alabama claims an increase from 3000 to 34,500 birds, and Mississippi from 150 to between 3000 and 23,000 ducks plus 325 Canada geese. On the Kentucky development an original flock of 700 geese has slightly more than doubled, and in Arkansas an area carrying about 100 birds before development now carries 3000 to 5000. Public reaction ranges from very high to moderate approval, and usually is high. Apparently most criticism comes from commercial hunting interest, which is quite natural.

The overall development situation seems to be that slightly more than half of the southeastern states are undertaking such projects, and about half of the states are doing well. In view of the excellent results obtained, it would seem that all states should desire waterfowl development projects. Although actual costs are high, they are quite reasonable in proportion to the results obtained, and since waterfowl work in most states gets a relatively small share of the budget, most states could afford to expand their activities. Considering the continual shrinkage of good habitat, it is certainly most desirable that they do so.