ACQUISITION AND DEVELOPMENT OF THE DEAL ISLAND WILDLIFE MANAGEMENT AREA SOMERSET COUNTY, MARYLAND

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The Deal Island Wildlife Management Area is located in Somerset County, Maryland's southwesternmost county on the peninsula commonly called the Eastern Shore, lying between the Chesapeake Bay and the Atlantic Ocean. The Management Area consists of nearly 8000 acres of marshland lying approximately 10 miles west of the County Seat of Princess Anne. The neck upon which the area is situated is bounded on the north by the Wicomico River and Monie Bay, on the west by Tangier Sound, and on the south by the Manokin River. This area of the county is distinctly rural, characterized by a patchwork of flat, relatively fertile farmland, swamp hardwoods or loblolly pine timberlands and extensive marshes.

Habitat Conditions

The Management Area is dissected by numerous creeks and ditches which permit tidal access from the surrounding bodies of water to the marsh interior. Portions of the marsh are flooded regularly to depths from a few inches up to 1½ feet by normal tides, while other portions are flooded only irregularly. Salinity of the water entering the marsh varies from about 12 p.p.t. to 20 p.p.t. depending upon the time of year and prevailing weather conditions.

Marsh vegetation consists mainly of two similar types and is characteristic of this region of the State. Nicholson and Van Deusen (1954) have classified the Maryland marshes into six basic types. Types IV and V are the predominent ones in the Deal Island area. Type IV, or the threesquare-Spartina-needlerush type, consists mainly of Olney's threesquare, needlerush, saltmeadow cordgrass and saltmarsh cordgrass in approximately equal proportions. Needlerush and saltmeadow cordgrass are the chief species on the more irregularily flooded areas, while Olney's threesquare is found commonly on the more moist sites. Other species such as saltgrass, tall cordgrass, and saltmarsh bulbrush are also prevalent in this type.

The needlerush-saltmeadow type, or Type V, covers large areas of the project. Hightide bush and groundsel bush are common on higher portions along stream banks and ridges and switchgrass occurs adjacent to the upland.

Utilization by migrating waterfowl is good. Such puddle ducks as blacks, teals, pintails, mallards, gadwalls, baldpates, and occasional other species are common during fall and winter months. A fair resident population of black duck is present during the summer months along with some blue-winged teal and a sprinkling of mallards and gadwalls.

Acquisition

Acquisition of the Deal Island Wildlife Management Area by the Maryland Game & Inland Fish Commission began as a Pittman-Robertson project with the purchase of the first tract containing 1757.5 acres in 1948. Since that time, 9 additional tracts have been acquired bringing the total area to 7922.5 acres. A tract of approximately 250 acres is presently in the final stages of acquisition.

The total cost of acquisition was $45,382.60. The cost of lands exclusive of attorney's and surveyor's fees ranged from a low of $3.00/acre to $11.10/acre. Approximately 56 percent of the total area or 4500 acres was purchased for $4.00 per acre or less. Individual tracts were relatively large, ranging from 417.18 to 1757.5 acres, the average being 880.27 acres. Unfortunately, complete records of settlement fees and survey costs are not available. However, records of the surveying costs for two tracts were found and computed to be 13.7 cents per acre on a purchase of 1092 acres and 10.3 cents per acre on an area of 727 acres. It is felt that these examples are probably near a low extreme.

No particularly troublesome acquisition problems were encountered, however, two cases which required deviation from normal procedure

might be noted. During the customary title examination of one tract it was discovered that a certain party had purchased a one-half interest in the land in 1875, but no subsequent conveyance of this interest was of record. Since none of the heirs of the party could be located, if in fact they existed, the Game & Inland Fish Commission instituted friendly condemnation proceedings with the owner's permission, in order to obtain a clear title. The Court awarded title to the lands to the Commission and the full option price to the owner.

In the other case, when negotiations with the owner of a key tract failed to produce a contract of sale at the appraisal price, condemnation proceedings were begun. However, before the matter went to Court, the owner agreed to sell at the appraised price and the proceedings were dropped.

Management Aims

The basic policy of administration of the Management Area is one of providing a place for public waterfowl hunting, and at the same time to maintain a refuge of sufficient size to provide sanctuary for resident and migrating birds. It was planned at the beginning of acquisition to accomplish as much improvement of existing natural conditions as possible with available funds by waterlevel management practices and vegetation control, and to improve hunter access to the marsh interior where practical. These objectives have been partially fulfilled. An area of 1800 acres had been delineated as a refuge, and some development work has been completed. Other work designed to improve habitat conditions is still being carried on and will continue for an indefinite period.

Development

It was immediately recognized that much of the project land was of sub-marginal quality as waterfowl habitat. Therefore, a program aimed at improving natural conditions by shallow flooding and waterlevel management was started in 1951. The first endeavor consisted of a creosoted timber gut plug or water-control structure across a road borrow ditch which formed the main drainage for about 400 acres of the marsh. This was a simple structure of round piles, 4" x 4" walers and braces, and 2" x 8" boards nailed together to form wakefield sheeting. Removable flashboards or stop-logs provided for manipulation of the impoundment level. Piling and sheeting were put in place by jetting and a watertight structure resulted. In addition, a small cut off plug of similar construction was installed in another ditch to prevent leakage of water out of the system via another watershed. Total cost of this work approximated $1700.00.

In 1952, a contract was awarded in the amount of $13,990 for additional work in the same general area. To increase the surface area of open water on the marsh, and thus increase the attractiveness for waterfowl, 132 potholes measuring 20 feet by 40 feet and 30 inches deep were dug at intervals of about 450 feet. Ditches connecting these small ponds were made 36 inches wide and 30 inches deep and caused the system to extend in a closed pattern for a total linear distance of about 12 miles. These ditches and ponds were constructed on both sides of an access road, therefore, culverts were placed under the road to equalize and maintain the water level in the entire system. In addition, a second gut plug was necessary to prevent water from leaking out of the area through a small creek. This plug was similar in construction to the first control device, and was accompanied by Commission personnel at a cost of about $650.00. As a result of this work, the area on which water was being maintained at marsh level by trapping high tides was increased to over 900 acres.

Other work accomplished under this contract consisted of raising the elevation of 1.3 miles of access road, construction of 4 turnouts, and surfacing with bank-run gravel to improve travel conditions.

In 1955, another area of the marsh was selected for treatment by water level stabilization. A site was found on Fishing Creek which leads to the interior of the marsh draining a considerable area of high tide ponds and otherwise affecting the drainage of approximately 175 acres. After lengthy consultation with engineers of the Armco Drainage and Metal Products Corporation and the Fish & Wildlife Service, it was

decided to try an installation of interlocking sheet metal piling fitted with removable gates, to accomplish the impoundment of tidal waters.

The original plan was to cross the 50 foot width of stream at right angles with interlocking sheets of 10 gauge steel, each 14 inches wide and 10 feet long. On each side of the stream, the structure was to extend an additional 30 feet into the marsh with 12 gauge sheets 6 feet long. Four removable gates on one side of the structure were included for water level manipulation.

A contract was awarded to the low bidder in the amount of $2475 for performance of the work using materials to be furnished by the Commission at a cost of about $900.00.

During the construction, considerable difficulty was experienced. A severe washout occurred under the piling in the stream despite the fact that it was driven into sand to a depth of nearly seven feet. This was accompanied by washing under the six foot sheeting at one stream bank caused by the terrific current generated when the passage of flowing tide water was constricted. In addition, it became readily apparent that the metal sheeting itself was of inadequate stiffness to withstand the pressure of tide action.

To correct the washout under the piling in the stream, 66 cubic yards of dry cement in 100 pound bags were placed in the hole on both sides of the sheeting. This was then backfilled with sand to the original stream bed elevation.

Prevention of additional washing at the sides of the structure was accomplished by pulling up 15 feet of the 6 foot piling on each end, welding these to the remaining 15 feet, and driving this assembly to a depth of approximately 11 feet. In addition, timber wing-walls were constructed at each end of the structure to further reduce the danger of end erosion.

To stiffen the entire structure and prevent bending under tidal pressure, a row of 8″ creosoted timber piles was driven on the downstream side of the structure to a depth of about 18 feet. A 6″ x 6″ waler was bolted to these piles. A connection between this and a 4″ x 8″ waler bolted to the sheet metal structure was made with 4″ x 4″ braces. To provide further strength, a ⅜″ x 2½″ angle was welded to each side of the metal sheeting along the spillway lip for the entire length of the structure.

Finally, to prevent any undercutting by the boiling action of water spilling over the face of the structure on ebb tide or when the flashboards are removed, a creosoted timber splash apron 6 feet in width was installed along the entire length of the structure.

Due to these difficulties, a considerable amount of extra work and materials were required. These factors increased the cost of the installation to slightly over $6500. However, no further difficulty has been experienced to date and the plug is functioning quite satisfactorily.

Since this sheet metal was tried as an experimental method of construction, we have been quite interested in the ability of the structure to withstand brackish water conditions. Despite a heavy coating of Bitumastic #50 applied during construction, severe rusting has occurred. It is quite likely that the structure will need rebuilding or conversion to a timber type within the next 5 years.

In 1958, field studies were conducted to determine the feasibility of flooding a 330-acre tract of the Deal Island marsh by using existing roads as dikes and constructing a creosoted timber control structure in the stream draining the area. Plans were developed and subsequently approved for this work. In addition, necessary improvements to the marsh access road would be made. In the spring of 1959 a contract for $19,605 was executed with the low bidder to accomplish the following items:

1. Construction of the timber water control structure.
2. Construction of 1165 feet of dike.
3. Raising the elevation of 6500 feet of existing earth roadway approximately one foot.
4. Surfacing and dressing 6600 feet of existing road with 6 inches of bank-run gravel.

Basically, the water control structure consists of a row of 10″ timber piles 25 feet long spaced across the 30 foot width of the structure, with 8″ piles 15 feet long on the upstream and downstream sides for bracers.

Other 8" piles supported the ends and wing walls. 4" x 6" walers bolted to the piles were used as stringers and braces to hold the wakefield sheeting in place. Wakefield sheeting was fabricated on the job by nailing together 2" x 8" x 12' planks.

Five openings with removable gates were spaced across the width of the structure providing a cross-sectional area equal to the original channel. Since it was imperative that the sheeting forming the gate slots be perfectly plumb, it was decided to place this part of the sheeting in two sections vertically, keying it together at the elevation of the bottom of the gate openings. In this way, inaccuracies in driving the wakefield could be compensated for when the upper portions were fabricated.

In view of the previous difficulties experienced while working in a tidal stream, it was decided to build this structure off to one side of the stream and excavate a new channel to it when finished. This proved to be a wise decision, and the work was carried along smoothly without hinderance of flowing water.

To begin construction, all piling were driven at the proper location on the marsh using a ¾ yard dragline crane equipped with swinging leads. Then a hole of sufficient size and to the required depth was excavated for the structure. Longitudinal walers were attached to the 10" piles at the top and bottom elevations of the gates and the wakefield sheeting was driven using these walers for alignment. Sections forming the gate slots were fabricated and keyed into this sheeting at the bottom elevation of the gates. The end sections and wing walls were then driven and the remaining walers secured in place with ⅝" galvanized bolts. Finally, the splash apron or floor was laid on the lower 4" x 6" braces.

A high capacity centrifugal pump was used to keep the hole dewatered during construction.

The removable gates were made up of 2" x 8" planks in the form of wakefield sheeting and placed horizontally in their slots.

Upon completion of the structure, all gates were removed and a new channel was excavated both ways to tie into the existing stream. From both ends of the structure a low dike approximately 1.5 feet above marsh level was built up in the form of a semi-circle across the marsh and tied into the State road right-of-way. A row of piling was driven at right angles to the old stream channel in the centerline of the dike to give support to the material used to fill across this section. Since tides could now ebb and flow through the new channel and structure, filling across this old stream presented no difficulty.

In retrospect, although construction of this device proceeded smoothly and it is now functioning very satisfactorily, several lessons learned might be worthy of mention. First of all, in beginning construction, it was assumed that it would be easiest to drive the piling prior to excavation of the hole in which to build the structure. This is no doubt true. However, upon excavation around the piles, it was found that some had not driven vertically, and even though at ground level they were in the correct place, there was considerable inaccuracy when restraining earth was removed and the pile straightened up. Only one pile was so far out of place that it had to be pulled and redriven. Nevertheless, the piles could probably have been driven more accurately, if perhaps with more difficulty, after excavation of the site had been accomplished.

The second point concerns the flashboards. Some difficulty has been experienced in removal of the gates due to insufficient clearance between the top 4" x 6" stringers. Since the impoundment is being operated on a spring drawdown—fall flooding basis, it is felt that easier and quicker operation would result if the gates were redesigned or the opening between the stringers increased by spacer blocks. Future plans include installation of new gates made of waterproof plywood treated with creosote, but perhaps sheet metal or thinner wooden material could be used as well. If the boards are removed only infrequently this feature may not be an important consideration.

Of the $19,605.00 bid by the contractor for all of the work in this contract, $7,160.00 was charged against labor and materials for the water control structure, $3,480.00 for excavation of the new stream channel and construction of the semi-circular dike, and the balance for labor and materials used in road work.

Access

In any public shooting area, access by the sportsman is of great importance if the resources of the unit are to be utilized to their fullest. The increased wildlife carrying-capacity of the land brought about by development activity is of little consequence to the hunter if he can not reach the areas where he will have a reasonable chance of success. On much of the Deal Island marsh, reasonably solid conditions make walking an easy matter. Jump shooting in the ditch and pothole system is often productive and the spoil banks make excellent trails for the hunter. However, there are large areas of the marsh where walking is extremely difficult and highly discouraging to all but the most ardent and experienced marsh hunters. Travel by small, shallow draft boat is best in these areas where use can be made of creeks and ditches and flooded marsh conditions. It is in these areas that access work has been centered. In 1959, while work was in progress on the timber water control structure just described, a canal was excavated from the marsh road then under repair to the head of Fishing Creek leading through the interior of the marsh to open water on the south side of the Management Area. This provides excellent boat transportation to much of the marsh but requires one short portage around the sheet metal gut plug on the lower reaches of the stream. In addition to the canal, a parking arena and launching basin were also constructed for public use.

In 1959, a similar canal was formed by blasting a short distance between the heads of two streams roughly parallel to the shoreline on the south side of the tract. This canal affords a great saving in time and distance and makes it unnecessary for small craft to venture into the often rough waters off shore.

Other such canals are planned to further facilitate hunter access to remote sections of the marsh.

Results

Results of these development projects over the past ten years are now beginning to show up. While there are no immediate data to substantiate this, regular observation by local technicians indicates a definite increase in utilization of the treated sections, notably by black ducks and blue-winged teals.

Beneficial changes in vegetation are also evident. In the ponds, ditches and potholes where water levels have been stabilized, widgeongrass is present in great abundance. Due to decreased salinity in these areas, sago pondweed is also very common. Olney's threesquare seems to be increasing near areas of open ponds formed by water control and needlerush appears to be at least static. In fact, Steenis and Warren (1959) have found that needlerush is easily killed by chemical spray, provided there is sufficient water on the marsh to keep the root system completely covered. This method opens the door to a program of needlerush control in inundated areas to break up large solid stands, creating better distribution of open water and more valuable waterfowl food plants.

In the section controlled by the large timber structure it is now possible to retain flooded conditions on extensive stands of saltmarsh bulrush during winter months, thus increasing its attractiveness to migrating birds. By drawdown in the spring, normal growing conditions of the plant are maintained.

Future Plans

It is contemplated that additional water control devices will be installed on the Management Area as funds become available. A structure featuring automatic tide gates is planned for at least one site which would provide water level stabilization on a large system of natural tidal ponds. Possibilities for use of tide gates at other locations will be investigated.

Extensive diking, in conjunction with control structures has not heretofore been done. However, this combination is being considered for some areas of relatively high marsh.

Additional access facilities will undoubtedly be needed as hunting pressure continues to increase. A marsh road or boat canal is contemplated to enable the public to easily reach a large isolated tract on the eastern side of the Area. Possibilities for better access to the western portion are also being explored.

Common and Scientific Names of Plants Mentioned

Olney's threesquare	*Scirpus americanus* (Persoon)
Needlerush	*Juncus roemarionus* (Scheele)
Saltmeadow cordgrass	*Spartina patens* (Aiton)
Saltmarsh cordgrass	*Spartina alterniflora* (Loiseleur-Deslongchamps)
Loblolly pine	*Pinus taeda* (Linnaeus)
Saltgrass	*Distichlis spicata* (Linnaeus)
Tall cordgrass	*Spartina cynosuroides* (Linnaeus)
Saltmarsh bulrush	*Scirpus robustus* (Pursh)
Hightide bush	*Iva fructescens* (Linnaeus)
Groundsel bush	*Baccharis halmifolia* (Linnaeus)
Switchgrass	*Panicum virgatum* (Linnaeus)

LITERATURE CITED

Nicholson, W. R. and Van Deusen, R. D. 1954. Marshes of Maryland. Resource Study Report No. 6. Maryland Game and Inland Fish Commission and Maryland Department of Research and Education.

Steenis, John H. and John Warren. 1959. Management of Needlerush for Improving Waterfowl Habitat in Maryland. Proc. Southeastern Association of Game and Fish Commission, 13:296-298.

1961 REPORT FARM GAME COMMITTEE SOUTHEASTERN SECTION—THE WILDLIFE SOCIETY

By EDWARD G. SULLIVAN, ROBERT W. MURRAY, ROBERT E. MURRY, LEE K. NELSON, *Chairman*

A Committee meeting was held in Atlanta, Georgia on August 16-18, 1961 with members Murray, Sullivan, and Nelson present.

ACKNOWLEDGEMENTS

Guests participating in some of the discussions at the Committee meeting included: Dr. C. W. Watson, Mr. Tom Steiner, Mr. Edward B. Chamberlain, Mr. Walter Rosene, Jr., Mr. Tad Lane of the U. S. Fish & Wildlife Service, and Mr. Leonard E. Foote of the Wildlife Management Institute. The Committee is indebted to these gentlemen for their ideas and very helpful comments.

Solicitation of ideas and comments from a number of outstanding men in the wildlife profession was conducted through correspondence by the Chairman. Those received provided the Committee with a wealth of material for consideration and they were much appreciated. Among those who graciously responded were:

Mr. Harold E. Alexander—Arkansas Game & Fish Commission
Mr. Jack Allen—Indiana Department of Conservation
Mr. Clayton Bushong—Indiana Department of Conservation
Mr. Jack Crockford—Georgia Game & Fish Commission
Mr. William R. Edwards—Ohio Division of Wildlife
Dr. Frank A. Hayes—University of Georgia
Mr. James E. Keeler—Alabama Department of Conservation
Dr. Edward L. Kozicky—Olin Mathieson Chemical Corporation
Dr. Joseph P. Linduska—Remington Farms
Mr. George C. Moore—Kansas Forestry, Game and Fish Commission
Mr. Scott Overton—Institute of Statistics
Dr. George A. Petrides—Michigan State University
Dr. Frederic H. Wagner—Utah State University.

The views presented in this report, however, do not necessarily represent the views of those whose names are mentioned here.

INTRODUCTION

Attempting to predict the status of wildlife and hunting conditions in the future is a complicated and difficult job. A great many unknown factors are involved which can easily alter the most carefully pieced