



UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
One Gateway Center, Suite 700
NEWTON CORNER, MASSACHUSETTS 02158

FINDING OF NO SIGNIFICANT IMPACT

Based on a review and evaluation of the information contained in the attached Environmental Assessment, I have determined that the Project - Perform Open Marsh Water Management of the Former Popular Point Mosquito Control Impoundment and Adjacent Salt Marsh, at the Barnegat National Wildlife Refuge does not constitute a major Federal action which would significantly affect the quality of the human environment within the meaning of Section 102(2)(c) of the National Environmental Policy Act of 1969.

June 2, 1981
Date

Howard N. Larn
Regional Director



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June 2, 1981
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Howard N. Loren
Regional Director

DRD:

ENVIRONMENTAL ASSESSMENT

PERFORM OPEN MARSH WATER MANAGEMENT ON THE FORMER POPULAR POINT
MOSQUITO CONTROL IMPOUNDMENT AND ADJACENT SALT MARSH

U.S. FISH AND WILDLIFE SERVICE
BARNEGAT NATIONAL WILDLIFE REFUGE

AND

OCEAN COUNTY MOSQUITO COMMISSION

LEAD AGENCIES

AND

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL MARINE FISHERIES SERVICE
NEW JERSEY DIVISION OF FISH, GAME, AND WILDLIFE
NEW JERSEY DIVISION OF COASTAL RESOURCES
NEW JERSEY DIVISION OF WATER RESOURCES
U.S. DEPARTMENT OF THE ARMY, CORPS OF ENGINEERS

COOPERATING AGENCIES

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I. PURPOSE AND NEED

A. Purpose and Need

A primary refuge objective on most areas where marshes occur is to provide habitat for waterfowl, other migratory birds, and endangered or threatened species of plants and animals. Other objectives may include: habitat preservation, promoting wildlife-oriented public use, and restoration of altered or damaged areas to a natural or near-natural condition.

The proposal, by the Ocean County Mosquito Extermination Commission (OCMEC), addresses an area of saltmarsh on Barnegat NWR that has been seriously altered by man's activities for a number of years. Under the plan, the area would be restored to tidal salt marsh using the Open Marsh Water Management (OMWM) concept.

B. Background

Tract 150, located in the Little Egg Harbor Division of the Barnegat National Wildlife Refuge, was acquired from the Nature Conservancy on September 23, 1974. The area was identified as a major breeding area for the salt marsh mosquito, Aedes sollicitans, and short-term pesticidal control using Abate was the primary control method. The situation did not change when the lands became a National Wildlife Refuge. Refuge permits were issued to the OCMEC for spot treatment of granular Abate for larvae control and Flit MIO to prevent emergence of adult mosquitos. In 1975, cumulative totals of 5,228 pounds of chemicals were applied to 2618 (cum) acres in thirteen applications. (See attachment #5 for a history of recent pesticide use on the proposal area.)

The proposal area is a 332-acre unit in the northeastern portion of Tract 150. In the late 1960's a developer, Lincoln Properties Inc., began dredge and fill operations in the wetland. The intent was to develop lagoon housing similar to the "Beach Haven West" area north of the proposal site. The developer had partially constructed a number of canals and a dike, and has used various areas of the unit for borrow activities. Construction was halted with the passage of the New Jersey Wetlands Act in 1970. The activities of the developer along with the natural filling of old, grid-type mosquito ditches, combined to make the area more prone to breeding mosquitos.

Between 1976 and 1978, the OCMEC obtained permits from state and federal agencies (including USFWS) to perform Open Marsh Water Management (OMWM) and construct a 150-acre low level impoundment in the project area. By August of 1978, the impoundment was in place and OMWM was completed on portions of the unit. Since that time mosquito control has been accomplished in these managed areas without the use of pesticides. However, a botulism problem occurred in the impoundment portion of the unit and a decision was made to breach the dike and return the area to tidal influences.

As soon as the OCMEC receives approval from the USFWS and secures the necessary permits, they will breach the dike at approximately 10 sites and excavate some ditches to return tidal inundation to the area. OMWM techniques or chemical treatment will be necessary in order to control mosquitos on areas not completely influenced by this action.

C. Vicinity Description

The proposal by OCMEC is to perform OMWM on 332 acres bounded on the north by Manahawkin Mill Creek, on the east by Manahawkin Bay, on the south by Oyster Creek and Landing Creek, and on the west by the refuge boundary in the vicinity of OBES Pond.

The project area is in Tract 150 of the Barnegat National Wildlife Refuge, Stafford Township, Ocean County, New Jersey. A vicinity map (#4) and project area map (#3) are attached.

D. Laws, Goals, Directives, Interrelationships

The Ocean County Mosquito Commission wishes to eliminate, as much as possible, short-term pesticidal control procedures for salt marsh mosquitos. OMWM was developed to facilitate long-term control without the use of chemicals.

The U.S. Fish and Wildlife Service and various other federal and state agencies, exercise review over activities in wetlands through the Coastal Zone Management Act, Section 10 of the Rivers and Harbors Act, the Clean Water Act, Executive Orders 11988 and 11990, and the NJ Wetlands Act. In 1976, the OCMEC was issued a special use permit to perform OMWM and build a low level impoundment in the proposal area. Due to the botulism problem that subsequently arose, the impoundment has been determined to be incompatible with the objectives of a National Wildlife Refuge. The US Army Corps of Engineers, in a letter dated August 5, 1980 has ordered that the impoundment be removed. The resulting marsh area that will be exposed will not regain biological viability. As described earlier, the area has been significantly altered causing an abnormal explosion in the numbers of salt marsh mosquitos. Additional management will be required to remedy this situation.

It is the policy of the USFWS to limit as much as possible the use of pesticides on National Wildlife Refuges. Section 3394 of the Refuge Manual states that, "Primary consideration will be given to the use of mechanical and/or biological controls." In addition, "Cooperation in area-wide insect control programs (greenhead flies, mosquitos, etc.) will also be subject to the approval of the Regional Director."

E. Concerns, Issues, Opportunities

This action is of major concern to the USFWS and the OCMEC. The issues of chemical use, mechanical alteration, biological control activities, and marsh restoration as each pertains to mosquito control all come into play. The public in the immediate vicinity of the proposed activity is accustomed to mosquito control work and, in fact, most summer residents expect "something to be done" about the "mosquito problem". At the same time, some long term residents oppose mosquito control -- no matter what form it takes.

At issue here is a proposal to alter a tract of marsh that has been seriously abused by man through time. The proposed action presents an opportunity to compare and evaluate environmental impacts of management schemes implemented in the same general area because Barnegat NWR contains salt marsh areas that have been subjected to different degrees of human alteration for 70+ years. If this project is approved, salt marsh in three different stages of development will simultaneously exist on the refuge. They are: 1) Previously ditched (grid) salt marsh, 2) Salt marsh which has been subjected to OMWM, and 3) Natural salt marsh.

II. ALTERNATIVES

A. Alternatives

There are four basic alternative actions associated with this proposal. 1) No action, 2) Chemical control, 3) Perform OMWM, and 4) Perform a combination of OMWM and Chemical Control. Following is a discussion of the alternatives and their potential environmental effects.

B. Description and Comparison of Each Alternative

1. NO ACTION

This alternative would leave the 332-acre tract in its present state. Numerous mosquito breeding depressions--mostly man-made--will continue to exist throughout the area. Some of the areas that were subject to tidal influences in the past (pre-1970) will not return to their natural state. The threat of botulism outbreaks will remain in these areas. Eruptions of salt marsh mosquitos can be expected to occur in the area. The potential for mosquito-borne diseases to spread, although minimal, may be enhanced. The nuisance effect of salt marsh mosquitos to the public can be expected to increase, along with complaints to both the OCMEC and the USFWS.

No expenditure of funds, fuel, or manpower, would be required by this alternative and no further manipulation of the marsh would occur.

2. CHEMICAL CONTROL

Under this alternative, mosquito breeding in the area would be monitored by the OCMEC and chemical treatments would be used to control mosquitos in accordance with approved state and federal permits. As

many as ten treatments per season may be necessary for effective control. Pesticides used would include: Abate 5G, Abate 4E, Flit MLO, and Altosid. According to product labels, Abate 4E and 5G although relatively non-persistent, are toxic to birds, shrimp, and crabs. No restoration of the damaged salt marsh will occur under this alternative. Increased amounts of funds, fuel, and manpower will be needed to effect mosquito control on the area.

3. OPEN MARSH WATER MANAGEMENT

The Standards for Open Marsh Water Management are attached (Attachment #1). These standards include: 1) tidal ditches, 2) pond construction and alteration, and 3) pond radial construction. Alterations by the commission will be accomplished using a rotary ditcher. The ditcher side-casts dredged material for a distance of up to 60 feet away from the ditch. This results in an elevation change to the marsh of 2" at most.

Tidal ditches that are constructed or cleaned would be approximately three feet wide and three feet deep. Meandering ditches will be constructed to approximate natural conditions. No grid-type ditching will be done. Ponds would be constructed where a large number of mosquito breeding depressions are located in a small area. Pond depth would be approximately one foot. A reservoir of three feet in depth would be installed in each pond. Existing ponds may be modified to meet these criteria. Pond radials would be constructed to connect breeding depressions to natural or man-made ponds. This enables fish to enter the depressions and devour mosquito larvae.

Under this alternative, tidal action would be returned to those parts of the unit which were previously subjected to tidal influences. Tidal ditches affect mosquito control by eliminating conditions that are conducive to larval development. Ponds, pond radials, and ditches provide reservoirs for killifish, (Fundulus sp.). The killifish devour mosquito larvae. The reservoirs in the ponds will enable fish to overwinter and withstand drought conditions.

All work would be performed according to the Standards for OMWM. The completed work is expected to control mosquitos for 20 years with little or no maintenance and without the use of pesticides. Spoil disposal may raise the marsh elevation as much as 2". The spoil would temporarily enrich deposition areas and increase vegetation there. It has been the experience of the OCMEC that the spoil area revegetates rapidly with the same vegetation. Salt marsh snails (Melampus bidentatus) may decrease in number. Mud snails (Nassarius obsoletus), fiddler crabs (Uca sp.), and killifish are expected to increase. The permanent ponds will provide resting and feeding areas for waterfowl, especially; black ducks (Anas rubripes), mallards (Anas platyrhynchos), and gadwall (Anas strepera). The ponds may also provide brood habitat for nesting waterfowl. Wading bird use should increase as additional feeding areas would be available. Restoration of an ideal salt marsh food web situation should occur within 4 years.

Cost estimates for the work are not available. Cost is dependent on the number of depressions encountered, machine reliability, etc. Other costs for the 20-year period would be limited to manpower expenses associated with monitoring the effectiveness of the project.

All costs would be borne by the OCMEC. Diesel fuel, a non-renewable resource, will be consumed. A net fuel savings should occur since aerial spraying of the marsh would not be necessary. Mosquito breeding would be significantly reduced in the project area.

4. A COMBINATION OF OMWM AND CHEMICAL CONTROL

This alternative would combine alternatives 2 and 3. Less disturbance (ditching) of the marsh would occur than in alternative 3. More chemicals would be applied than in alternative 3, but less than alternative 2. The costs and benefits would lie somewhere between those outlined for alternatives 2 and 3. Since the project area is already disturbed and is relatively small (less than 4% of the refuge area) this alternative would add little to our knowledge of the differences between the two techniques. In addition, this combination management would be difficult to implement on such a small area, and may lead to unnecessary use of pesticides where breeding mosquitos are not present.

Therefore, this alternative is considered impractical and will not be addressed further.

C. PROPOSED ACTION

It is proposed that alternative #3, Perform Open Marsh Water Management, be employed to effect mosquito control on the unit. When compared to the other alternatives, this option will effect the most complete and permanent mosquito control, at the lowest cost, and with negligible adverse environmental affects. It is also the alternative which most closely coincides with the stated policy objectives of the Department.

III. AFFECTED ENVIRONMENT

Barnegat Refuge, located in southeastern New Jersey, is primarily tidal saltwater marsh habitat. Rainfall and runoff from adjacent uplands along with tidal movement creates a diverse situation that benefits over 400 vertebrate and numerous invertebrate species.

Numerous man-made mosquito ditches exist throughout the area. Developers adjacent to portions of the refuge had created "lagoon housing" prior to enactment of the Wetlands Act. There is clear evidence of early stages of lagoon development in the project area portion of the refuge in the form of dikes and ditches constructed prior to wetlands legislation and refuge acquisition. A resultant management problem exists with refuge produced mosquitos and adjacent housing areas. In the past, the Ocean County Mosquito Extermination Commission has been issued special use permits for chemical control of mosquitos on this and other portions of the refuge. This cooperation is expected to continue. A proposal has been made by the OCMEC for removal of the existing impoundment (about 150 acres of the proposal area). This work is expected to commence in the Spring of 1981.

The area of the proposed OMWM is in close proximity to "Beach Haven West", a lagoon development with over 20,000 summer residents. Over 100,000 summer residents live within a five mile radius of the area. Fishing, crabbing, and clamming are popular recreational activities adjacent to refuge owned lands. Extremely shallow bays restrict pleasure boaters to marked waterways. Pestiferous mosquitos and greenhead flies also tend to make land based recreation uncomfortable; so recreation for the most part is from watercraft. The

absence of people has increased wildlife utilization of the area. Bald eagles (Haleaeetus leucocephalus) utilize the area during migrations. Peregrine falcons (Falco peregrinus) have been released on the refuge approximately three miles northeast of the project site. In 1980, a pair of falcons successfully nested and raised young at the hacking site. Both bald eagles and peregrine falcons are listed by the Department as endangered species. The American Osprey, a state listed endangered species, has nested on the refuge and adjacent areas in recent years.

IV. ENVIRONMENTAL CONSEQUENCES

Effect of the Open Marsh Water Management will be to restore the area to as near a natural condition as possible. Tidal influence will be restored to most areas altered by man. Ponds, pond radials, and ditches will increase diversity in the salt marsh. Resting and feeding areas for waterfowl and waterbirds will be created.

The marsh will be permanently altered. The question is will this alteration be better than previous changes imposed by man? The dredge and fill activities that occurred in the past were detrimental to the marsh environment. The proposed OMWM will benefit the environment by increasing the diversity of plants and animals within the marsh. Pesticides will not be used, thereby eliminating possible toxic side-effects on the marsh food chain.

V. COORDINATION

A restoration plan for the project area has been developed by the Ocean County Mosquito Extermination Commission, and is attached to this

assessment (Attachment #2). The commission has cooperated with the Environmental Protection Agency, National Marine Fisheries Service, Army Corps of Engineers, Fish and Wildlife Service, New Jersey Division of Fish, Game and Wildlife, New Jersey Division of Coastal Resources, and the New Jersey Division of Water Resources. These agencies have assisted the commission in permit requirements that could include requirements under the:

- A) Coastal Area Facility Review Act, P.L. 1973 c.185 (NJSA 13:10-1 et. seq.)
- B) Wetlands Act of 1970, P.L. 1970 c.272 (NJSA 13:9a-1 et. seq.)
- C) Riparian or construction permit R.S. 12:5-3
- D) Section 10 of the River and Harbor Act of 1899
- E) Federal Water Pollution Control Act, Section 404 of P.L. 92-500
- F) Marine Protection Research and Sanctuaries Act of 1972, Section 103 of P.L. 92-532

These laws require that state and federal permits be obtained which authorized structures and work in or affecting navigable waters of the United States and the discharging of dredged or fill material into waters of the United States.

The OCMEC has been granted a permit by the Army Corps of Engineers to perform the proposed work (Attachment #6). OCMEC has applied for a riparian permit from the NJDEP Division of Coastal Resources. A waiver has been obtained from the NJDEP Division of Water Resources for water quality certification (Attachment #7). If the work is authorized by the USFWS, a letter stating such will be forwarded to the OCMEC and work will commence under the terms of a previously issued Special Use Permit (Attachment #8). The Absecon Office of

Ecological Services, U.S. Fish and Wildlife Service, has been consulted during the planning phase of this project and the preparation of this assessment.

Recent on-site inspections of the area have been completed by field employees of the Mosquito Commission, the Fish and Wildlife Service, and the State Division of Fish, Game and Wildlife.

News releases describing the proposed work have appeared in local newspapers. It is anticipated that the public will be in favor of the proposed work since it includes provisions for continued mosquito control.

STANDARDS FOR OPEN MARSH WATER MANAGEMENT (OMWM)

County mosquito commissions, Rutgers University and the New Jersey Division of Fish, Game and Shellfisheries have been perfecting one technique, Open Marsh Water Management (OMWM) for the control of all genera of salt marsh mosquitoes on open tidal marshes for over two decades. Perfection is achieved by continued improvement and evaluation. In order to ensure the finest quality and identify this management technique, certain standards are a necessity. These standards should be included in any riparian or other permit. Improper adherence to these standards would be a violation of the permit and infringement on the quality of the management technique. The following standards shall be utilized and strictly adhered to in any OMWM project:

- I. NEED. OMWM will be based entirely on need and utilized on breeding marshes only.
 - A. OMWM will be confined to the Spartina patens or mixed S. patens, short S. alterniflora or types of similar vegetation that are irregularly flooded by rains, spring or storm tides. It will not be employed on marshes that are regularly inundated or affected by daily tides such as tall saltmarsh cordgrass (Spartina alterniflora), wildrice (Zizania aquatica), cattail (Typha spp.), arrow arum (Peltandra virginica), threesquare (Scirpus olneyi) and other types of similar vegetation.
 - B. All alterations must directly affect mosquito breeding depressions.
 - C. The direction and type of alteration used will depend on the distribution of the mosquito breeding depressions and their proximity to natural ponds and tidal ditches.
 - D. An experienced wildlife biologist, mosquito control worker, or both, shall stake out all breeding depressions ahead of the equipment. Depression marking shall be utilized to determine the least amount of alteration needed to eliminate mosquito breeding.
 - E. All mosquito or other ditches encountered that are not contributing to breeding mosquitoes will not be cleaned.
 - F. When possible, ponds previously altered by mosquito ditches will be restored.
- II. ALTERATIONS. Three types of alterations (tidal ditches, ponds and pond radials) will be used.
 - A. Tidal Ditches
 1. All tidal ditches will be dug with suitable equipment, preferably with a rotary ditcher.
 2. When mosquito breeding depressions are located adjacent to a tidal, mosquito or other ditch, a tidal ditch alteration will be utilized.
 3. When a tidal ditch is dug near a pond, the spoil should be deposited on the pond side.
 4. Attempts should be made to dig tidal ditches to a depth of approximately three feet. Meandering or straight ditches are acceptable.
 5. Main tidal ditches are used to provide tidal circulation through large areas. They should be connected to a tidal source on both ends where possible. Their location is determined by the distribution of breeding depressions.
 6. Lateral tidal ditches connect breeding depressions to mains, natural tidal ditches or other laterals. Such laterals often dead-end in a breeding depression.

7. All mosquito or other ditches that are breeding will be cleaned.
8. Spoil shall be used whenever possible to fill adjacent mosquito breeding depressions or spread evenly over the marsh to encourage growth of existing vegetation.

B. Pond Radials

1. All mosquito breeding depressions located near a natural or other permanent pond shall be connected to this pond by pond radials. These radials will provide access for fish to devour mosquito larvae in the depressions.
2. All pond radials shall be constructed with suitable equipment, preferably with a rotary ditcher.
3. To prevent drainage of a pond by muskrats or snow geese, all pond radials shall terminate at a sufficient distance from a tidal ditch.

C. Ponds

1. Where large numbers of mosquito breeding depressions are concentrated in a limited area, a pond alteration will be utilized.
2. Pond construction is accomplished by the use of the rotary ditcher, amphibious crane or other suitable equipment.
3. Ponds should be shallow, less than one foot in depth, to promote the best waterfowl, wading and shore bird use.
4. To prevent mosquito breeding during droughts, a reservoir three feet in depth shall be installed within the pond.
5. These reservoirs should provide proper pond access by humans. When large numbers of radials are used, reservoirs are unnecessary.
6. Reservoirs for fish can be ensured in natural ponds that dry out during droughts by construction of three foot ditches with a rotary ditcher or other suitable equipment. These reservoirs will connect all the lowest areas within the pond.
7. Pond spoil should be squashed and leveled without causing depressions. It should be reduced to the lowest possible level to ensure reestablishment of existing vegetation. Spoil shall approximate the level of the existing marsh.
8. Ponds may take the shape of the breeding area or may be squared off to facilitate construction. The shape of a pond or ditch does not appreciably affect wildlife use. Depth, food potential and availability are the main factors that determine wildlife utilization.

III. OBJECTIVES

- A. To adequately serve the three major objectives (control mosquitoes, eliminate insecticides and enhance the tidal food web) all three alteration types (tidal ditches, ponds and pond radials) shall be utilized on each section of marsh whenever possible. Diversity provides a better marsh environment, prevents marsh surface breeding by all genera of mosquitoes and enhances both major branches of the tidal food web.
- B. Insecticide use is gradually phased out as OMWM progresses to eliminate breeding acreage. When the project is completed, all insecticide use should terminate.

IV. OTHER TECHNIQUES

Impoundments, stop ditches and other types of management techniques are not OMWM.

V. EVALUATION

Mosquito larval dippings, vegetational plots, invertebrate sampling and wildlife censuses are to be conducted on the area treated with OMWM and compared with a control of similar composition.

RESTORATION PLAN FOR POPULAR POINT IMPOUNDMENT
AND ADJACENT SALT MARSH

In an area of salt marsh known as Popular Point, just south of the Beach Haven West development in Stafford Township, Ocean County, New Jersey, permits were granted both from the U.S. Corps of Engineers and U.S. Fish and Wildlife Service in 1976 to perform marsh management for mosquito control. Work commenced early in 1976 and continued until the end of August 1978. During that time, a low level impoundment was constructed on the Point and Open Marsh Water Management was partially completed on the remainder of the site.

Since that time botulism problems have occurred within the impoundment while the remaining area within the project site is periodically treated by aerial pesticide applications. The pesticides are still required since the Open Marsh Water Management was not completed at the expiration of the permit in 1978.

The project area is a 332 acre tract of salt marsh, the location of which has been previously described and shown on the accompanying map. Prior to our management in 1976, the area had been proposed to be used as a development by the then owner, Lincoln Properties, Inc. The company had been developing heavily just north of Mill Creek for some time and was just beginning dredge and fill operations in the proposed project area when the N.J. Wetlands Act was enacted. His equipment had been digging at the project site and had constructed nearly half of the current dike by that time. Also, several lagoons had been started and left at various stages of completion. Additionally, scoops had randomly been taken from the marsh and used to build the dike or were placed in a ditch to aid the machine's crossing.

It was because of the partially completed dike and the severity of the disruption in the immediate area that an impoundment was constructed. The area had traditionally been a bad breeding site, but breeding potential was enhanced after the disruption to the point at which it necessitated up to ten larvicide treatments per season. In the remainder of the area, which had been previously grid ditched, O.M.W.M. had been partially completed. At the time, this was our worst breeding area, and since it was located only about 100 feet south of a large development, management was conducted as soon as was possible.

Marsh management was begun in early 1976 by the Ocean County Mosquito Commission with the commencement of dike building for the Popular Point Impoundment. Prior to that time, only grid ditches were present. The breeding depressions between the parallel ditches

along with the disruption of the marsh caused by the interrupted construction necessitated the management. The impoundment was chosen as the preferred method of management by both mosquito control and Fish and Wildlife Service agencies due to the presence of the previously constructed dike accounting for nearly half of the work required and other man-made disturbances. Once completed, no mosquito breeding of any species was found within a 150 acre impoundment that formerly required up to ten treatments per year.

As described before, Open Marsh Water Management was applied to sections of the project area outside of the dike. This management was done through the use of the rotary ditcher from July 1977 to August 1978. The areas completed during that time have not needed any pesticide treatments since that time.

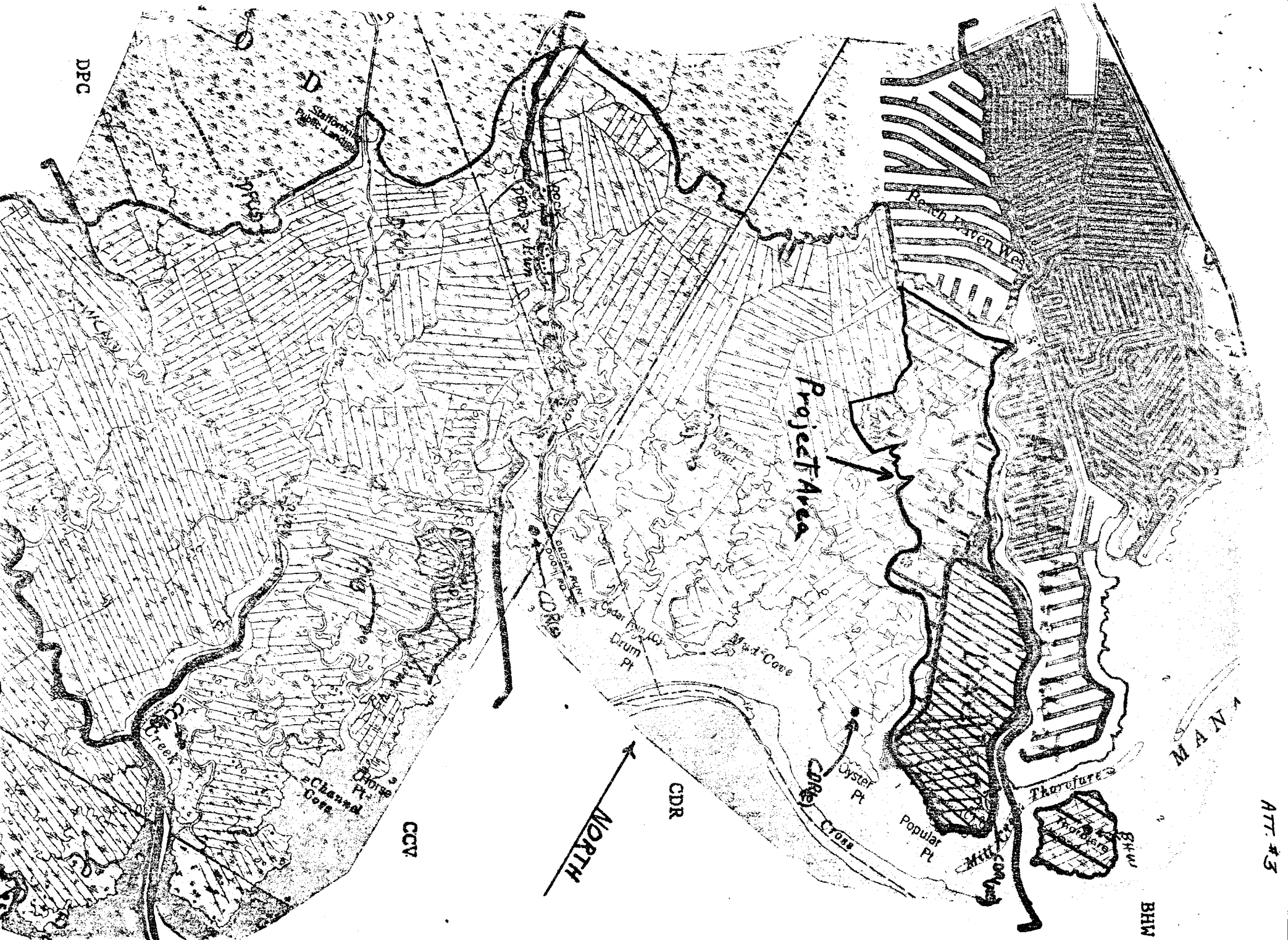
Since the termination of the management procedures in 1978, effective mosquito control has been achieved in the completed areas. In the Open Marsh Water Management areas no adverse effects have been noted. However, outbreaks of botulism within the impoundment have affected the bird populations every summer. Due to the bird mortalities incurred, it has been decided by various Federal, State, and County agencies that it would be to the best public interest if the impoundment was removed. Open Marsh Water Management will subsequently be needed within the formerly impounded area in order to prevent it from returning to its original breeding potential (up to ten times per season) and necessitating reestablishment of repeated chemical treatments.

The first proposed step would be to break the dike at approximately ten selected sites. Part of the dike will be pushed onto the adjacent dike and leveled there. The previous marsh elevations will have been restored in these areas. Ditches will then be excavated through these breaches to connect the previously impounded area to tidal sources. In most cases the excavation will require the reestablishment of old tidal mosquito ditches. This step has been previously addressed as a separate proposal and an environmental assessment has been prepared by U.S. Fish & Wildlife Service. Work will commence as soon as the Ocean County Mosquito Commission receives approval from the U.S. Fish & Wildlife Service.

Next, the rotary ditcher will be brought into the area to finish the reconditioning of the tidal ditches where required. Open Marsh Water Management will then be initiated in the area to control mosquito breeding formerly controlled by the impoundment. Following the completion of the O.M.W.M. within the old impoundment, the rotary ditcher will then finish management in the rest of the project area which was not completed in 1978. At the conclusion of the project, 332 acres of salt marsh, directly adjacent to the Beach Haven West development, will have been managed through Open Marsh Water Management.

The bulldozer will be used first to level the dike and drain off most of the water. After the formerly impounded area has had ample time to dewater and solidify to some extent, the rotary ditcher will be used inside of the dikes. Until such time as the dewatering is satisfactory, the rotary ditcher can work in the adjacent areas.

The method of management will be Open Marsh Water Management as per the New Jersey Standards set up by the New Jersey Mosquito Commissions, Rutgers University, and New Jersey Division of Fish, Game and Shellfisheries and approved by the Army Corps of Engineers, Federal Environmental Protection Agency, National Marine Fisheries, and Fish and Wildlife Service, (See enclosed). The project will be supervised as normally done by the Ocean County Mosquito Commission. All staking will be done by the Marsh Management Specialist just prior to management but progress will be monitored by the U.S. Fish and Wildlife Service's area manager. Because of the random nature of mosquito breeding and the inaccuracy of mapping, a detailed prior plan is impossible to construct. However, all staking and management will be done in strict adherence to the Standards.



BHM

BARNEGAT NATIONAL WILDLIFE REFUGE

ATT. #4

UNITED STATES
DEPARTMENT OF THE INTERIOR

OCEAN COUNTY, NEW JERSEY

UNITED STATES
FISH AND WILDLIFE SERVICE

74°17'30"

74°12'30"

74°07'30"

39°45'00"

39°45'00"

39°40'00"

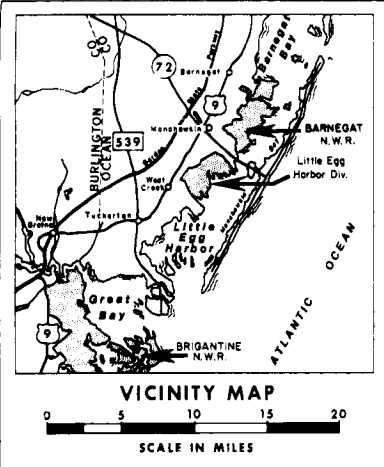
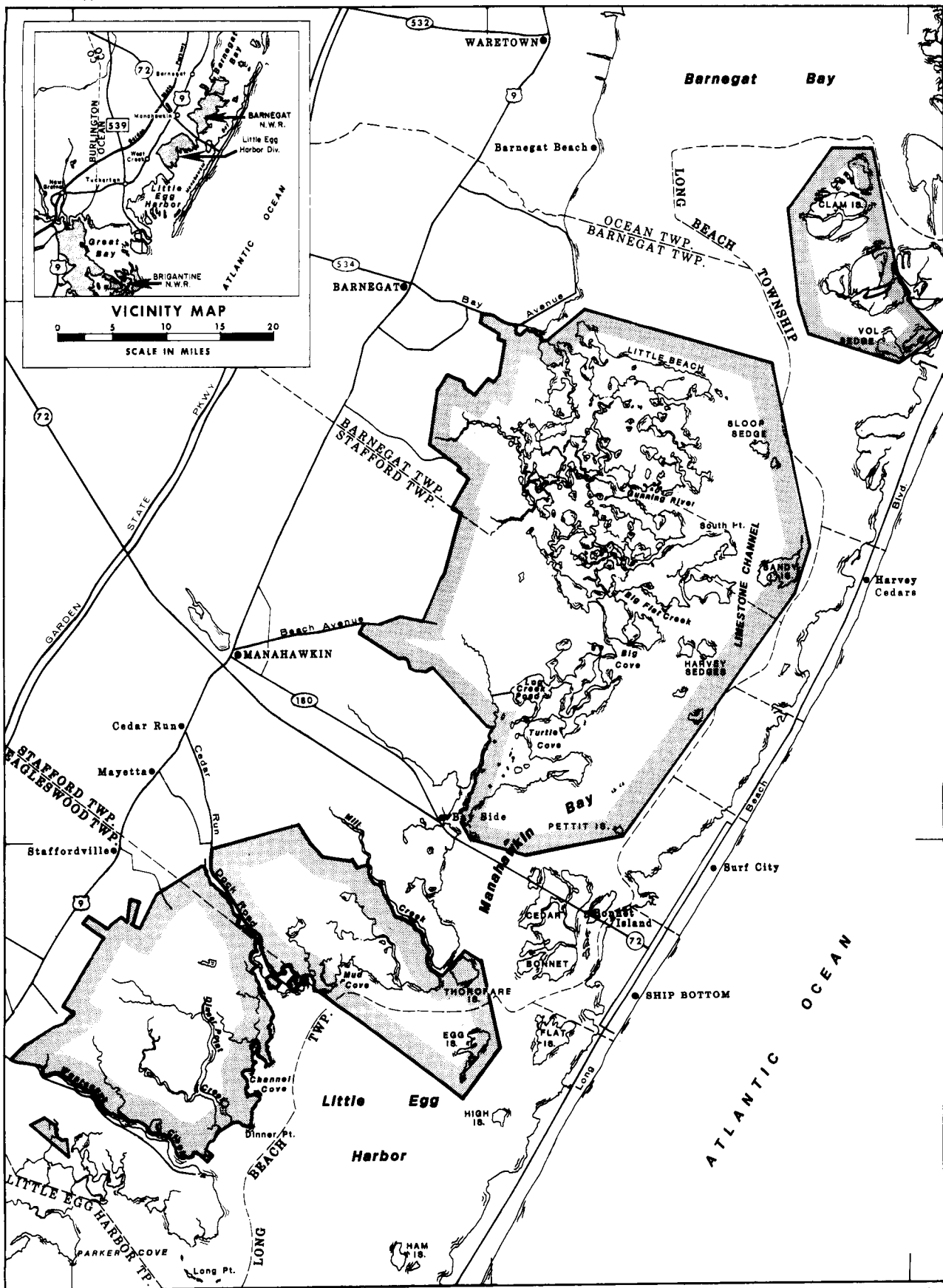
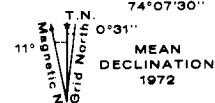
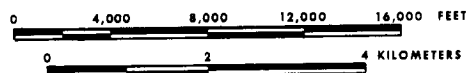
39°40'00"

74°07'30"

74°12'30"

74°17'30"

COMPILED IN THE OFFICE OF REALTY
FROM SURVEYS BY U.S.G.S. AND F.W.S.



Ocean County Mosquito Extermination Commission

WEST BAY AVENUE - POST OFFICE BOX 327
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~~FREDERICK M. LEESE~~

Thomas M. Candeletti
Acting Superintendent

March 4, 1981

Mr. Anthony Leger, Manager
Barnegat National Wildlife Refuge
686 East Bay Avenue
Barnget, N.J. 08005

Dear Tony:

Enclosed please find several items as requested by you in our March 3 phone conversation. The Corps permit allows us to perform Open Marsh Water Management (OMWM) at the refuge site. Also, on March 3 I spoke with Mr. Charles Parkell, Jr. of the Division of Water Resources. He confirmed that the Water Quality Permit Waiver (WQC #80-12-5) applied to both the breaching of the dike as well as the OMWM. The Riparian permit application has been sent to Trenton and is undergoing review.

The enclosed maps are sections of the U.S.C.G.S. maps containing the project area. The mosquito larviciding records for the years 1974 through 1980 have been transferred to these maps. Please be advised that the copies only depict the number of treatments made on the proposed project site of the refuge. Larviciding data for the rest of the refuge was not transferred to these maps.

As you can see, the area was heavily treated up to the commencement of management in 1978. 1976 was an unusually light mosquito year and should not be used in any statistical analysis of the mosquito breeding potential of the area. Following the completion of the impoundment in 1978, no further treatments were made in that area. Also, treatments were eliminated in the areas in which OMWM was completed. The 1979

Mr. Anthony Leger, Manager
March 4, 1981
page 2

map shows a treatment at the extreme northwest section of the refuge that was erroneously made by the New Jersey State Airspray Program. The elimination of the heavy mosquito producing sites has allowed us to locate and concentrate efforts in other areas as shown on the 1980 map.

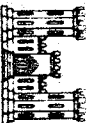
An attempt is now being made to find photos of the refuge both before and after management. Any photos which are found will be copied and sent to your office.

Sincerely,

A handwritten signature in cursive script that reads "Richard Candeletti".

Richard Candeletti
Marsh Management Specialist

RC:fs
enclosures



**DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
PHILADELPHIA DISTRICT
NOTICE OF AUTHORIZATION**

A PERMIT TO perform mosquito control work in Bar
Refuge, Stafford Township, Ocean County, New J

AT

HAS BEEN ISSUED TO Ocean County Mosquito

ADDRESS OF PERMITTEE Extermination Commission
P. O. Box 327

PERMIT NUMBER West Bay Avenue
Barnegat, NJ
08005

for

NAPCE-R-80-0677-3

**ENR Form 4336
Jul 70**

THIS NOTICE MUST BE CONSPICUOUSLY



DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
CUSTOM HOUSE-2 D & CHESTNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

IN REPLY REFER TO

NAPOP-R-80-0677-3

11 FEB 1981

Ocean County Mosquito
Extermination Commission
P. O. Box 327
West Bay Avenue
Barnegat, NJ 08005

Gentlemen:

Inclosed is a Department of the Army permit authorizing you to perform mosquito control work in the wetlands in Barnegat National Wildlife Refuge, Stafford Township, Ocean County, New Jersey.

Your attention is directed to Condition (n) of the permit which concerns notification of the District Engineer of the commencement and completion



State of New Jersey

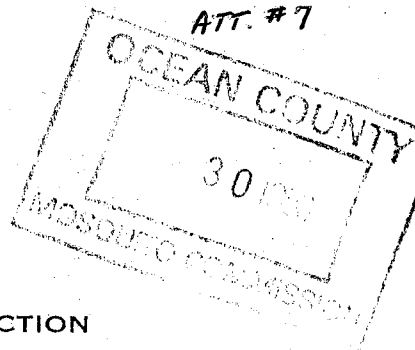
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF WATER RESOURCES

P. O. BOX 2809

TRENTON, NEW JERSEY 08625

Arnold Schiffman
Director



Mr. Thomas M. Candeletti
Acting Superintendent
Ocean County Mosquito
Extermination Commission
P.O. Box 327
West Bay Avenue
Barnegat, New Jersey 08005

DEC 24 1980

RE: WQC #80-12-5
Impoundment Breach
Barnegat National Wildlife Refuge
Popular Point Mosquito Impoundment
Stafford Twp., Ocean County



UNITED STATES DEPARTMENT OF THE INTERIOR
U.S. Fish and Wildlife Service

BARNEGAT

National Wildlife Refuge

SPECIAL USE PERMIT

Permit number Sta. No. to be credited

BA-81-1

5-2512

Contract number

Date

DECEMBER 10, 1980

Permittee (Name and address)

OCEAN COUNTY MOSQUITO EXTERMINATION COMMISSION

PO BOX 27

BARNEGAT, NEW JERSEY 08005

Period of use (inclusive)

From January 1 1981

To December 31 1981

Purpose (Specify in detail privilege requested, or units of products involved)

Control mosquitos by the use of Open Marsh Water Management as described elsewhere in this permit. This will provide a permanent control of mosquito breeding, co-existent with wildlife use and production.

Description (Specify unit numbers, metes and bounds, or other recognizable designations)

North portion at the Little Egg Harbor Division of the Barnegat NWR. Bounded on the North by Mill Creek, East by Manahawkin Bay, South by Oyster Creek and Landing Creek, and West to the refuge boundary and immediate vicinity of OBES Pond.

Amount of fee \$ No Charge

1974



1975

BHW



CDR

1976

BHW

BHW

Poplar Pt

Dyster Pt

CDR



1977

BHW

BHW

Thorofair Island

Poplar Pt

Oyster Pt

CORIE

CDR

Rock Haven We

CRUI

Mason Pond

Mud Cove



BHW



1980

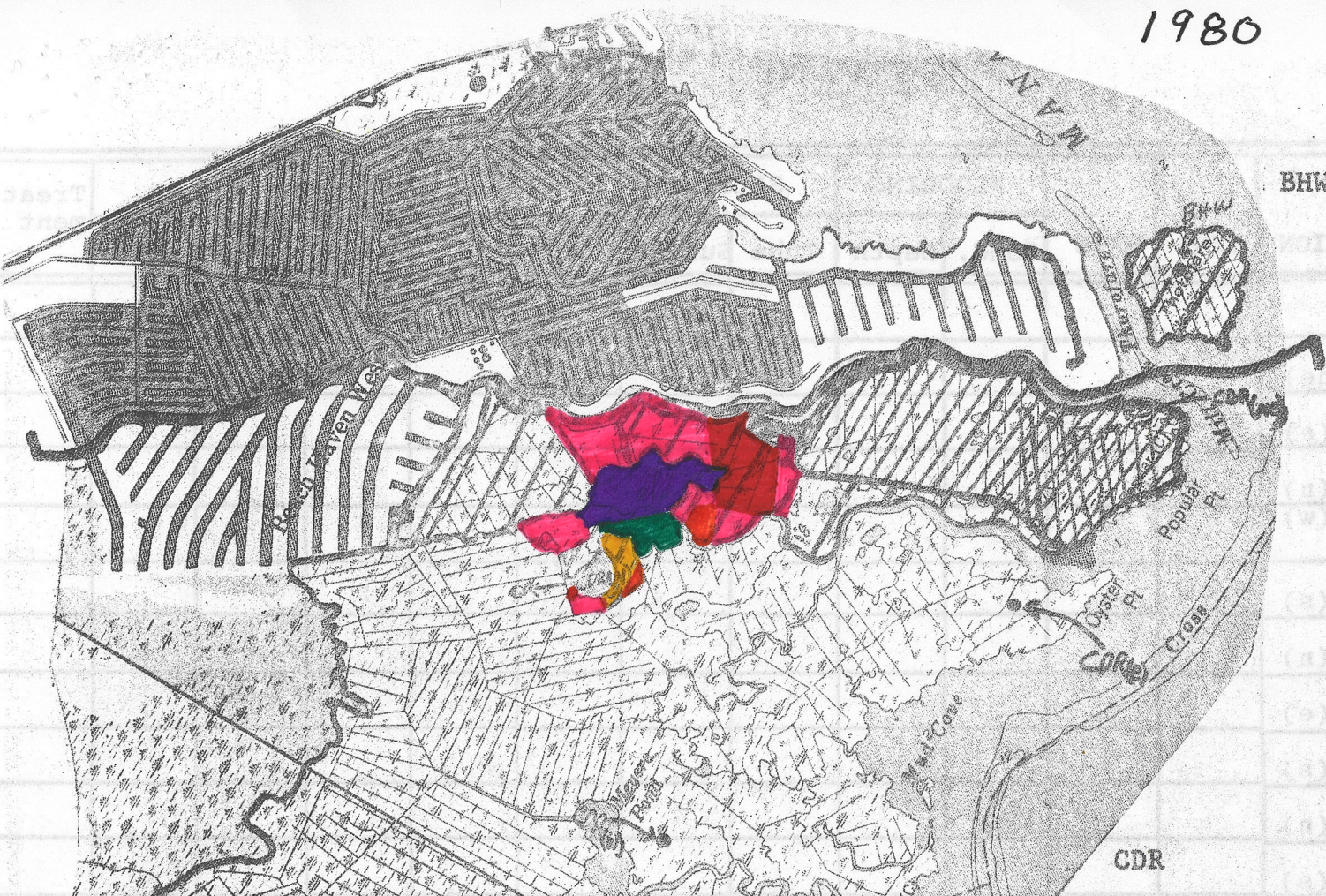
BHW

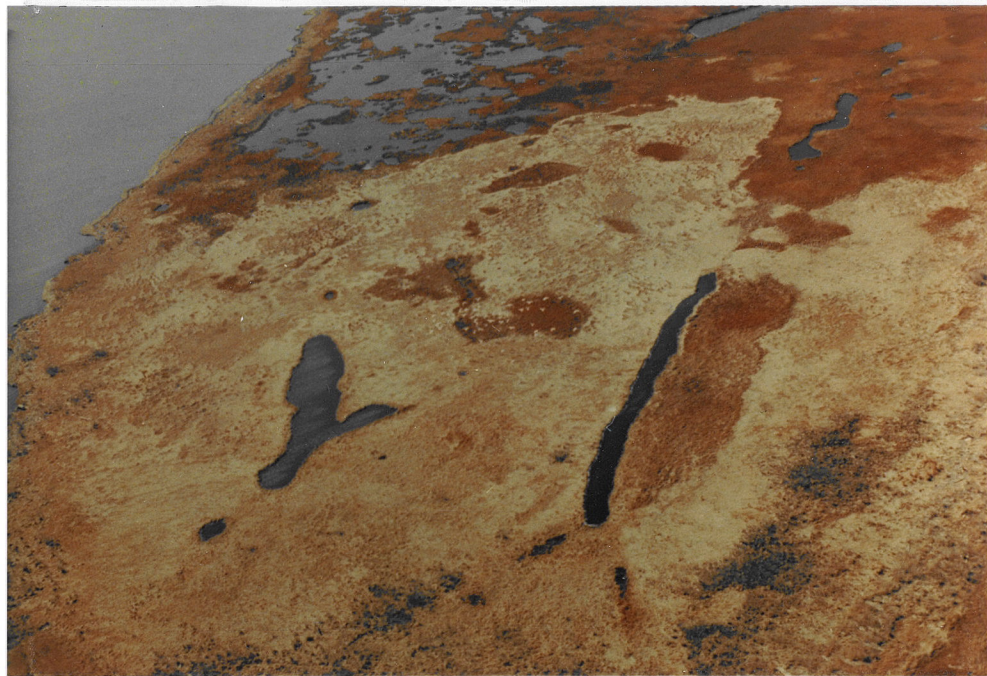
BHW

Popular Pl

Oyster Pl

CDR





AM

Secy 1 2

HP 1 2

H/F 1 2

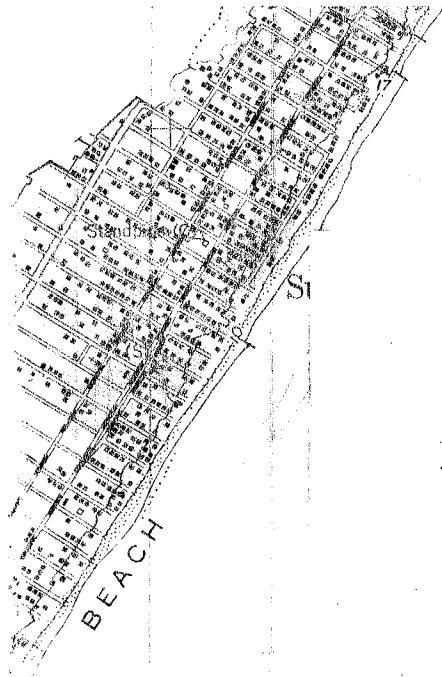
*R/W 1 2

GLC 1 2

AO

File:

ABOVE: CLAM ISLAND, MARCH 1977, BEFORE
OPEN WATER MARSH MANAGEMENT (OMWM).



N
E

40'

4390

4389

AREA

DESCRIPTION OF MANAGEMENT

- A. 95% completed, some "Laterals" or "Pond Radials" possible.
- B. Mostly "Ponds & Radials", some "Laterals" off of existing ditches
- C. Mostly "Ponds & Radials", however, more extensive management than B.
- D. 25% managed. Remaining management to be 50% "Ponds & Radials" and 50% "Laterals" off of existing tidal pond and ditches.

4392

4391

40'

4390

UNC. U.S. 9128 MI.

Meyers
Pond

Bench Haven West

Bay Side

180

MANA HAWKI

