

A Study of the Purposes and Operation
of the
Erie National Wildlife Refuge

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INTRODUCTION

Let us begin on a broad, general scale - What is a National Wildlife Refuge? What prompted their origins? What are their objectives? - and then move on to Erie National Wildlife Refuge in particular.

The National Wildlife System

National Wildlife Refuges play an important role in the conservation story of the United States. In combination, they make up the National Wildlife Refuge System - a farflung collection of lands and waters selected for their value to America's wildlife populations, particularly migratory birds and rare mammals. Over 330 refuges totaling 30 million acres are now in the System.

The history of the national wildlife refuge program began with the establishment of the Pelican Island Refuge in Florida in 1903 by an executive order of President Theodore Roosevelt to protect a magnificent colony of brown pelicans and other colonial nesting birds. Their existence was threatened by ruthless slaughter for their plumage, which was sold to the millinery trade. Later, Roosevelt established additional

refuges on public lands, the Congress set aside more areas, and succeeding Presidents established a number of refuges by special orders.

In 1929, the Migratory Bird Conservation Act provided authority for the purchase of lands needed for migratory bird refuges. The Fish and Wildlife Act of 1956 authorized the acquisition of refuge lands for the conservation and protection of all kinds of wildlife. The Endangered Species Preservation Act of 1966 provided for refuges to protect vanishing wildlife and gave official designation to the national wildlife refuges as a System.

The National Wildlife Refuge System is still growing. The Bureau of Sport Fisheries and Wildlife in the U.S. Fish and Wildlife Service of the Department of the Interior, administrator of the System, recognizes that secure habitat for many kinds of wildlife is far from adequate. Many more acres of wetlands - marshes, swamps, lakes, and streams throughout the nation - must be added to the present chain of refuges if water-loving species are to survive as a basic resource. New areas are needed to provide habitat for birds and other mammals in danger of extinction from increasing human pressures of many kinds.

Although national refuges protect many types of wildlife, they play an especially important role in management of the international migratory waterfowl. Three-fourths of all refuges were originally established for these birds. Since 1934, most of the money used to purchase waterfowl refuges has come from the sale of migratory bird hunting stamps.

Within the National Wildlife Refuge System are also numerous Waterfowl Production Areas. These are small pothole marshes in the Prairie States capable of producing large numbers of ducks. Emphasis has been placed since 1962 on the acquisition of these areas, to prevent their imminent destruction by drainage and conversion to non-wildlife uses. Over a million acres of these small but valuable wetlands have been purchased and leased.

About 50 refuges are used chiefly by migratory birds other than waterfowl. On them are found dense nesting colonies of pelicans, herons, ibises, egrets, and spoonbills, and a large array of sea birds.

A number of refuges are well known for providing habitat for rare and endangered species. Among them, the Aransas Refuge is the principal winter home of the whooping crane. Red Rock Lakes Refuge is a center of abundance for the trumpeter

swan. Other refuges are havens for the key deer, desert big-horn sheep, and albatrosses.

National wildlife refuges are popular places to find large numbers of many kinds of wildlife. Few other sites afford opportunities to see such great, stirring concentrations of waterfowl and other birds.

Refuges not only harbor birds and mammals, but also provide for species of plants, insects, amphibians, and reptiles. Many refuges have fine scenic and historical values that are preserved along with the wildlife.

Frequently, refuges are thought of as self-operating wildlife paradises from the time they are established. More often than not, they have been developed from areas misused by drainage, lumbering, burning, and overgrazing, and needing restoration to become first class wildlife habitat. This is accomplished mainly with dams, dikes, and fences, and through farming programs to produce special and supplemental wildlife foods. Management may also employ irrigation systems, regulated livestock grazing to provide habitat for more successful wildlife use, soil conservation practices, forestry programs, or rough fish control.

Many refuges contribute substantially to local economies. By law, local governments share in the revenues from grazing, haying, sale of timber, and other economic uses on refuges necessary for the best management of wildlife habitat. Refuges add to the economic bases of their communities through local expenditures for food, supplies, and lodgings by people visiting the refuges for recreation, through local purchases by the refuges of supplies and contractual services, and through the payrolls of refuge employees.

More than 19 million visits are made to national wildlife refuges annually. Visitors are welcome when their activities do not interfere with the primary wildlife management program. Wildlife trails, interpretive centers, and other facilities are provided as funds are available. Fishing is permitted on many refuge waters. Hunting of migratory game birds, as well as of resident species of game, is allowed on parts of many refuges, in accordance with State and Federal regulations. Such hunting helps to regulate and distribute wildlife and prevents local overuse of food supplies.

The special mission of the National Wildlife Refuge System is ^{to} provide, manage, and safeguard a national network of lands and waters sufficient in size, diversity, and location

to insure the protection of wildlife of all types, and to provide environments in which human relationships with land and wildlife are encouraged.

Erie National Wildlife Refuge

Erie Refuge was established in 1959 as another link in a chain of National Wildlife Refuges. Although managed primarily for waterfowl, an abundance of other kinds of wildlife is present. A wide diversity of habitat types, from open water to hardwood forests, provides living conditions favorable to many wildlife species found in the Northeast. Lowland with adjacent upland borders Lake and Woodcock Creeks (see attached map) the length of the refuge. Swamp woodland, marsh, poorly drained pasture and cropland, and abandoned farmland are typical of much of the area.

Geographically, Erie Refuge lies in one of the narrow valleys of scenic Crawford County in northwestern Pennsylvania. This hilly country in the upper reaches of the Allegheny River watershed was moulded during the last continental glacial age. Lakes, swamps, and marshes along the many meandering creeks are bounded by forested slopes and meadows. Small patches of cultivated land are interspersed with woodlots and pastures on the rolling terrain between the valleys.

Most of the 5,150 acres acquired to form this refuge, in common with much of Crawford County, consisted of abandoned farms. Crop and pasture lands had reverted to brush and timber. Logging had long since ceased to be a major source of income. Beavers had increased in swamps and marshes that man had never disturbed.

Historically, in 1787, when the first settlers built their crude cabins on the present site of Meadville, ten miles west of the refuge, the region was occupied by the Seneca Indians. They used the refuge area to hunt deer, black bear, wild turkey, and other game.

A few years later, there was a marked increase in settlers. Veterans of the Revolutionary War received 500 acre tracts as partial payment for their services. Evidence of these tracts was still apparent in the ownership pattern when the refuge was purchased. About two-thirds of the refuge land were these so-called "Donation Lands." The other third of the refuge area was settled about the same time by members of the famous Holland Land Company.

Timber was the first source of income during these early days of settlement. The pioneers cleared just enough land to produce the crops and livestock needed to maintain

themselves. Until local sawmills were built, logs were felled, marked, and placed in creek beds to await high water in the spring to carry them to the Allegheny River where they floated to mills in Pittsburgh. Shingles and potash were marketed later.

The tanning industry with its high demand for hemlock bark accompanied the lumber industry. John Brown's famous tannery is still located 15 miles northeast of the refuge in Cambridge Springs. In later years a diversity of industries flourished - grist mills, a powder mill, a pottery factory, a wooden bowl factory, and cheese factories.

With the removal of the choice timber, emphasis on farming slowly increased. A variety of crops was attempted as the pioneers shifted from mere subsistence farming. Precipitation averages 40 inches a year. A short 130-days growing season, the long winters with extremely low temperatures, and a snowfall averaging 60 inches were factors that caused the growing of many crops to become unprofitable.

Since 1900 dairy farming has been the main form of agriculture, with hay the most important crop. Feed oats, silage corn, wheat, and buckwheat are grown on a few acres. At the time of purchase of Erie Refuge, most of the owners of refuge land worked in surrounding towns.

In order to get a clearer picture of the waterfowl program at Erie, it is necessary to retrace our steps again. Before the appearance of the white man, Crawford County was a valuable waterfowl nesting area and served as a resting area for the vast flight of migrants going to and from breeding grounds in Canada to wintering spots along the Atlantic coast.

Man changed all this. As early as 1850, few beavers were left. Without nature's dam builder, lowered water levels on many wetlands in the county destroyed food and cover vegetation. The land was intensively cultivated. For many decades there were few ducks in any season, and no geese.

This picture changed dramatically during the 30's. Within two years after being created, the Pymatuning Reservoir became a major waterfowl nesting and resting area. Also, the Pennsylvania Game Commission commenced purchasing and developing wetlands. All of this occurred in a period of great draught when waterfowl populations were at an all-time low.

Today, Crawford County is the most important waterfowl area in the Commonwealth. Marshes developed on 14 State Game Lands are valuable waterfowl nesting areas, and a host of ducks use these waters during the spring and fall migrations. State Game Lands 214 on the Pymatuning Reservoir is a major Canada goose migration and nesting area.

In the future, waterfowl production and migration use will continue to increase manyfold when Erie Refuge and other potentially high-quality wetlands are developed to their full potential by the Game Commission and the Bureau of Sport Fisheries and Wildlife.

All National Wildlife Refuges have one principal objective--to preserve wildlife and wildlife habitat for people to enjoy. The Erie Refuge is being developed to provide nesting and resting habitat for ducks and geese. Marshes and uplands are being managed first and foremost to supply ideal nesting conditions for the mallard, wood duck, and black duck. Also, many waterfowl, migrating between Canadian breeding grounds and winter areas on the Atlantic and Gulf coasts, will stop for rest and food. The environment for an interesting variety of other migratory birds and resident wildlife will be preserved and improved.

Achievement of refuge objectives depends on planned development and management of the land. A wildlife refuge is land managed specifically for wildlife.

On a refuge conceived with a variety of wildlife species, each with peculiar requirements, five basic habitat

types are essential--marsh and water, crops, grass, brush, and timber. The quantity, quality, diversity, and interspersion of these habitats decisively dictate the kind and abundance of wildlife on a refuge.

Development of programs to promote optimum recreational, educational, and economic use of refuge wildlife and lands are given major emphasis on the Erie Refuge. Over 2,000,000 people live within a radius of 50 miles, and 8,000,000 people within 100 miles.

Erie Refuge Visitation Log

It is my intention to periodically visit the Erie Refuge to observe how the above-mentioned objectives are being implemented in the daily operations of the refuge. It should be noted that I have the full cooperation of the refuge manager, Roger Steelman, and his assistant, Richard Antonette, who have gone to untold lengths to schedule and include me in a variety of refuge activities.

January 30, 1972. I was introduced to the resident staff consisting of refuge manager, Roger Steelman, his assistant, Richard Antonette, clerk, Janet Marvin, and maintenance men, Robert Granda and Dick Gilbert. Roger and Richard are

formally trained in wildlife management. An auto tour of the refuge's 5,000 plus acres followed (see attached map). Two large water impoundments and 5 upland ponds are being managed to maintain desirable waterfowl habitat. Water control structures permit manipulation of water levels to promote optimum growth of waterfowl food plants, and to restrict growth of vegetation of lesser value. The land adjacent to the pools is cultivated to produce grain and browse crops such as winter wheat, buckwheat, and millet, which serve to supplement the natural aquatic food plants. Haying and grazing are encouraged to keep marsh edges in proper condition for nesting waterfowl and to maintain openings in forested and brushy areas. Numerous wood duck nesting boxes and goose nesting platforms dotted the marshy areas. Enroute to the nature trail, Roger's and Richard's homes on the refuge were pointed out, as were abandoned farm buildings. Use of the refuge for nature study, photography, birdwatching, and sightseeing is encouraged. The Pool 9 Overlook and Beaver Run Trail provide excellent settings for these activities. A picnic area on a wooded bluff overlooking Pool 9 is open from 6 A.M. to 9 P.M., May 30 to October 15.

February 6, 1973. A telephone call from a nearby farmer told of an injured deer off the refuge. Roger recorded the information and in turn called Bill Lee of the Pennsylvania Game Commission, and we all met at a predetermined location outside Mt. Hope. A brief glimpse of the deer indicated there was nothing that could be done for it as it had two broken forelegs. It was painlessly disposed of. Bill then took the doe to his headquarters to freeze it so a local Boy Scout Troop studying conservation might see the embryo of the fawn. After lunch preparation was made to host several local high school students studying Water Conservation. An illustrated talk by Richard facilitated the study of the water cycle, chemical makeup of water, the purposes of wetlands, etc. The refuge encourages educational tours, talks, and student field projects.

At this point I would like to interject a few notes on wetlands. As wetlands comprise a sizeable portion (400 acres) of the Erie Refuge, they are apropos. Wetlands are among the world's most productive lands, yet almost 57 million of the nation's original 127 million acres of wetlands have been destroyed by drainage, siltation, pollution, dredging, and channelization. Our nation's remaining 70 million acres

of wetlands are decreasing at an accelerated rate of over one percent per year.

The National Wildlife Refuge System recognizes the high values of shallow water areas, and continually monitors losses to man and wildlife on these areas.

The Bureau's wetland management program is aimed chiefly at providing habitat for migratory birds and wildlife species threatened with extinction. These wetlands are divided into six major categories:

- a. Open waters
- b. Fresh, brackish and salt marshes
- c. Wet meadows
- d. Wooded swamps
- e. Bottomland hardwoods
- f. Intermittently flooded croplands

Management practices vary considerably from one location to another. Northern programs are oriented toward production of waterfowl, whereas southern programs are oriented toward food and cover for wintering and migrating birds. Some of the important practices include:

- a. Manipulation of water levels to regulate plant succession, and to control botulism and other waterfowl diseases.
- b. Propagation of millet, alkali bulrush, and other important emergent waterfowl foods.
- c. Grassland inundation to encourage bird feeding and resting.

- d. Cultivation of farm crops to supplement natural foods.
- e. Hay meadow management to provide green browse for geese, and rest sites for water loving birds.
- f. Chemical control of undesirable fish species which muddy the water and inhibit plant growth.

February 13, 1973. A young man stopped in the office to check on fishing regulations. Several ponds had been stocked and, except for ice fishing, were open to any licensed Pennsylvania fisherman. In addition to the information he sought, the young man was also told what kind of fish he might expect to catch and where. For example, warm water fish including pumpkinseed, black crappie, yellow perch, large mouth bass, muskellunge, blue gills, and bullheads thrive in Lake Creek and Sugar Lake Inlet. Trout and suckers are present in Woodcock Creek. Roger told the young man of the problems caused by carp--their muddying the water inhibits plant growth. A carp-controller was thus recruited! As it turned out, the fishing information was secondary to his checking out employment possibilities. As he did not have a college degree his chances of securing employment in a professional position with

the Refuge System were nil. It was then suggested that he contact the Pennsylvania Game Commission with the idea of entering their training program.

At noontime Rich Antonette and I set out to check beaver traps. A 15 minute stalk in the snow turned up nary a trap! The primary purpose of this foray was to see that no trapper set more than 10 traps, and that these were properly tagged above water; and in addition, to insure that the traps were at least 25' feet from the water line on the structure of any beaver house or dam. When open to hunting, trapping, and fishing on Refuge land, sportsmen must comply with State Game and Fish regulations. Thus in the case of trapping, furbearers are managed to control their influence on waterfowl populations and habitat.

After this, Rich and I drove to Meadville where we met Dr. Sam Harrison, a geologist at Allegheny College. Dr. Harrison was recently given funds to purchase some stream monitoring equipment. It is his intention to become intimately acquainted with a stream on a year-round basis. If all goes well, he would like to make it an on-going, long term project--perhaps lasting ten years. For this reason he was looking into streams where there were no dams or impoundments upstream.

that would interfere with year-round natural stream flow. Rich pointed out on a map some possibilities on the Erie Refuge. If the sites are chosen, Erie Refuge stands to benefit in two ways. As a courtesy, Dr. Harrison and his students would relay stream information and data to the Refuge. In addition, the Refuge is credited with a number of Refuge Benefit Units (RBU's) because of school-sponsored, student activity on Refuge acreage. A refuge's funds and prestige are partially base on RBU's accrued. For this reason research and academic activities are greatly encouraged on the refuge.

February 20, 1973. The greater portion of the day was spent driving around the Erie Refuge and the newly acquired Seneca Unit (more on this at a later date) in order to chart what crop was grown where last summer. Parcels of refuge land are cooperatively farmed, i.e. a farmer grows his crop on refuge land. In return payment for use of the land, the farmer cannot harvest one-quarter of his crop or a crop designated by refuge personnel. This quarter is left standing for wild-life food. A problem arises when too much corn is available. The omnipresent corn deters migrating waterfowl from continuing their southern movement. This "short-stopping" in turn

makes many southern hunters unhappy. Thus in some areas corn is giving way to buckwheat. Buckwheat when first hit by snow, is bent over and eventually covered--thus encouraging waterfowl to move on to more southerly climes.

Today, our twenty-minute sortie into a different beaver area paid off. In the snow we readily followed a trapper's tracks to his beaver traps designated by name tags above the water. While checking what was thought to be a legally baited area (fresh-cut aspen branches), Rich and I discovered a trap not marked with the trapper's name above water. Since the trapper's name was on the set under water, we could only assume the trapper had set more than his allotted number of traps (10). This violations was then reported to Bill Lee of the Pennsylvania Game Commission.

February 27, 1973. The Seneca Unit is under the administration of the Erie Refuge. This 2,800 acre area, eight miles north of Erie Refuge, is located along the north side of Route 408 between the towns of Teepleville and Cambridge Springs. When acquisition and development are completed, this area will provide food and shelter for migrating waterfowl and other wildlife. Acquisition is continuing.

A word about acquisition procedures. Desirable waterfowl areas are the object of a continual search by trained biologists. Once a project is selected for possible inclusion in the National Wildlife Refuge System, an engineering survey is made to determine adequacy of water supply, development possibilities, and their costs. The resulting reports are carefully reviewed by special committees which then make recommendations to the Director of the Bureau of Sport Fisheries and Wildlife for consideration and approval.

When projects are approved, detailed appraisals are made to estimate the market value of the land. A report of the estimated purchase cost is presented to the Migratory Bird Conservation Commission. Approval by the Commission is required before a refuge can be established. This includes consideration of the cost and conditions of purchase for the land. With Commission approval, negotiations for the purchase of land can begin.

As acquisition agreements are accepted in behalf of the United States, purchase money is set aside, and work is started. Bureau field personnel actively assist in the work of clearing title and processing the agreement. Finally,

title in the United States must be approved by the United States Attorney General before payment is made.

In establishing National Wildlife Refuges, condemnation proceedings are used only as a last resort. Condemnation is most used when there are title complications and ownerships are in doubt, to assure a satisfactory title.

This morning I met Bill Parrish who works for the Soil Conservation Service in Meadville. He came to the Erie Refuge armed with aerial photos and topographic maps of the Seneca Unit. The purpose of his visit was to advise Erie personnel on how to optimally use the Seneca Unit. With the help of the maps, soil samples, and surveying equipment, a soil conservation plan had been previously worked out. A map of the Seneca Unit was colored to correspond with a soil color chart (see attached "Land Capability Classes"). Thus one can see at a glance where the best soil with little slope and the least fertile soil is located. The next step is to make the most of what is there. A number of fields are planted in corn, buckwheat, oats and hay. Because of poor soil, some fields are used as pastureland. Erie is one of the few refuges in the east where grazing permits are issued.

As farmers will soon be applying for farming permits, Bill's expertise on soil conditions and tolerances was most helpful to Rich. Rich must decide which crops should be planted where--keeping in mind what's profitable to the farmer and at the same time beneficial to wildlife.

Since there was a thin cover of ice remaining on the ponds, the afternoon was spent gingerly approaching wood duck nesting boxes and goose nesting platforms. Our purpose was to make a census of the waterfowl who nested there the previous spring and to freshen the boxes and platforms with wood chips. By removing the conical shaped roof, one can readily see the remnants of an old nest--feathers, down, eggs, egg membranes. The bureau keeps a record of the number of eggs and egg membranes in a clutch. This gives them an idea of the size of the waterfowl population and how successful the nesting sites are. For example, the woodducks have readily adapted to their rocket-shaped boxes. On the other hand, the mallards and black ducks have refused to patronize the fiberglass hanging baskets. Our census of Reitz pond indicated the size of the clutch varied from 4 - 12. From what I saw, less than 50% of the eggs were hatched. Judging by the number

and size, the hornets nesting in the boxes were much more successful. More on the nesting boxes at a later date.

March 5, 1973. The Bureau of Sport Fisheries and Wildlife administers more than 330 national wildlife refuges throughout the United States. They provide nesting, feeding, and resting areas for all forms of wildlife, especially waterfowl and endangered species. To improve administrative efficiency, the Bureau is divided into five geographical regions. Erie Refuge is part of the northeast region with headquarters in Boston.

Today, the Erie Refuge served as host to Mr. Willard Spaulding, Deputy Regional Director from the Boston office. Mr. Spaulding carries some impressive credentials having worked with Secretaries of the Interior: Udall, Hickel, and Morton. The greater portion of the morning was spent in showing him around the Seneca Unit. The big event of the day occurred as we were trying to turn around on a narrow, muddy road. The jeep and chain gang were called in to extricate us from our muddy demise.

Topics discussed during the visit were varied--the importance of education to get into the Bureau, the value of

regional workshops for all personnel (management, clerks, maintenance), the possibility of northern personnel assisting in the warmer regions during the winter months, the idea of the Bureau assisting in financing undergraduate and graduate degree work, the prevailing trends in the Bureau as regards promotions, law enforcement, employment for minority groups, etc. The day was well spent in exchanging opinions with a man in the upper echelon.

March 13, 1973. The greater portion of the morning was spent at a staff meeting. Attitudes, policies and personalities were discussed.

This is a good opportunity to pass on some information and statistics concerning the Wood Ducks. The Wood duck normally nests in tree cavities. By erecting nesting boxes, preferably over open water, the population can be increased. At first the boxes are seldom used because the ducks have to get accustomed to using them (imprinting). Years later, an entire Wood Duck population can be imprinted and on reaching maturity, nest in the boxes. There are 125 boxes on the refuge. Of these 15 - 25% are used each year producing 100 - 300 ducklings. Ideally, all boxes are checked in July

to determine production. In February the boxes are cleaned and wood chips added. The newer nesting boxes are inverted metal cones resembling a rocket. The shape, material, and the small tunnel entrance help to deter the wood duck's number 1 and 2 enemies--the raccoon and snake. Once the clutch has hatched, the young leave the shelter of the box immediately. Thereafter, the occupancy of the box is up for grabs. The new tenants may be tree swallows, squirrels, or hooded mergansers. More at a later date on nesting areas of the Canada Goose, mallard, and black duck.

The afternoon was spent at the maintenance barn. Here much of the heavy equipment--high lift, tractor, etc. are stored for the winter. In anticipation of their spring usage, the oil and filters were being changed. In between jobs, the purple martin house was cleaned and the entrance holes plugged to bar the pesky starlings. It is doubtful there will be purple martin tenants this year as Hurricane Agnes annihilated their ranks last year. Because of the heavy rainfall, the insects took cover in the bushes and grass thus denying the martins of their preferred diet. Afterwards, Bob, Dick, and I took a quick run over to a neighboring marsh in the hopes of seeing some early migrants. Our effort

was meagerly rewarded by the sight of a mallard, muskrat, and newly constructed beaver lodge.

March 20, 1973. The morning was spent viewing two films, "Great Swamp" and "So Little Time." The former was a combined effort of National Education Television and Bureau of Sport Fisheries and Wildlife. Filmed at Great Swamp Refuge, thirty miles outside of New York City, the movie introduced an urban boy to the great outdoors. The viewer follows the boy as he discovers wildlife in all its glory. The film would appeal to elementary school youngsters. The latter film is geared to a general audience. Roger Tory Peterson points out the need for maintaining our dwindling wetlands to insure perpetuating our waterfowl. Produced by the Department of the Interior this was the better of the two films.

During the course of the past week, Dick took soil samples of the fields to be planted this spring. This afternoon he bagged and tagged each soil sample in preparation for sending it to Penn State's Agricultural Department for analysis. Once analyzed it will reveal what the soil needs in terms of lime and fertilizer. The refuge will pay for the analysis (\$2.00 per sample) and purchase the lime. In return

the refuge will get one quarter of the harvest.

The remainder of the afternoon was spent painting a newly constructed purple martin house--white and spring green in deference to today's vernal equinox!

On to goose nesting platforms....Of the 25 nesting platforms on the refuge, 3 were used last year. The geese will use them as they prefer to nest on a high point with good visibility, such as an island, or an open section of shore, or a high point in a marsh. Straw nesting material is man-placed because the goose won't carry it to the nest as a robin does. Average size of clutch is 7 eggs.

Nesting baskets are used by Mallards and Black Ducks. Again, of the 25 erected on the refuge, 3 were used last year. Average size of the clutch is 11 eggs.

March 27, 1973. Yesterday, while "censusing" the wood duck, nesting boxes, Rich noticed two whistling swans on Meyers pond. While using the spotting scope, he detected a black collar on one of them. Several years ago Rich received some material concerning a study of migratory whistling swans. Several swans had been trapped and collars with radio transmitters were strapped around their necks. The purpose of which

was to chart their migratory route. Thinking this was a similar study, Rich contacted a Dr. Sladen at Johns Hopkins University. When Rich gave him the number on the black collar, Dr. Slader then referred him to Dr. William Gunn in Toronto. Dr. Gunn heads an ecology research consulting service. At this time, Dr. Gunn was in the employ of the Canadian Department of Transportation and Canadian Wildlife Services. Both had underwritten the expense of studying the speed and altitude of the migrating whistling swans, the purpose of which is to avoid future jet-bird mid-air collisions. With this in mind, Dr. Gunn's staff went to Black Water National Wildlife Refuge along the Chesapeake Bay in Maryland. There six whistling swans were trapped, five of which were banded with radio transmitters and dyed canary yellow. The sixth, after being banded, escaped. This white renegade was the one which found its way to the Erie Refuge. In the meantime, the other five had somehow eluded their airborne trackers, so when Rich contacted Dr. Gunn, the latter was so overjoyed that he quickly dispatched a pilot and staff member, Paul Minivich, from Port Huron, Michigan to Erie to verify it. Once here, Paul verified it and decided it was worth the expense to set up a field station at Erie, knowing full well that the pair of swans could

take off at any time. So back to Port Huron to get personal belongings and radio tracking equipment.

Today was spent preparing for his return. The abandoned Bolen house (to be used as headquarters) was readied for Allegheny College students who are going to monitor the swans' whereabouts. They will be paid \$20.00 for an 8-hour shift. The plan calls for them to contact Paul who, along with his pilot, (both will remain in the Meadville Refuge area) will head for the Meadville airport. Once airborne they plan to follow the swans, monitoring their speed and altitude.

At 12:30 p.m. Rich and I, along with two psychology professors from Allegheny College, Alex Dale (Dr. Gunn's son-in-law) and Dick ?, met Paul on his return to Meadville airport. Provisions were made for a rental car and motel. After lunch we went back to the refuge to check on the swans' whereabouts. Once assured of their presence, Paul and the professors went back to the airport. They planned to fly over Pool 9 (the swans had flown over from Meyers Pond during the night) checking out the direction and range of the radio transmitters. At this point in time, I left for Slippery Rock, amazed at the power of attraction of the two visitors dabbling in Pool 9.

April 3, 1973

The migrating whistling swans of last week were short-term visitors. Sometime during the night of last Tuesday/Wednesday, the transients were again enroute to their nesting grounds. Because of a faulty or weak radio transmitter, their departure went undetected until dawn. Several aerial passes were made over other refuge impoundments, all to no avail. Capricious Mother Nature had again eluded the technology and gadgetry of science.

The morning was spent at Allegheny College in Meadville. Rich sought the advice and help of Dr. Gary Finni of the Biology Department. Rich hopes to conduct a pond study on the Refuge. He plans to determine what, if any, effect the drawdowns have on the aquatic invertebrates. Research indicates that invertebrates comprise a sizeable portion of a nesting hen's diet, as well as her young ducklings. If the water table were lowered, would this change the quantity and quality of the invertebrates? If so, what length of time is required for the invertebrates to again reach their previous state of colonization? Dr. Finni made several helpful suggestions in terms of reference texts, equipment, and similar studies currently underway.

It was gratifying to learn that one of the goose nesting platforms, cleaned and freshened several weeks ago, is now being used by a pair of Canada Geese.

Plans were made for meeting next Tuesday at Moraine State Park. There, plans will be formulated on how best to host the upcoming Boy Scout jamboree, with 41,000 Scouts expected.

April 10, 1973

Today I met Roger and Rich at the Boy Scout Office in Moraine State Park. A meeting, hosted by Walt Wenschel, Scout Coordinator, was called to iron out problems involving the preparation of exhibits, displays, etc. for the Boy Scout Jamboree to be held in August. As 41,000 Scouts are expected, logistics, sites, etc. must be established. Because of Erie Refuge's involvement in the Jamboree, Bill Whalen, Conservation Coordinator and Bob Bernath, Visual Information Specialist, flew in from Boston to lend a professional hand in preparing exhibits. The theme for their exhibit is "Rare and Endangered Species." One of their ideas involves staging a nesting site of the Bald Eagle--complete with bald eagle--an expendable, mounted specimen. "Planting" a 6' - 8' man-made eagle nest

in a live 40' tree is a project in itself. Could it be done with a cherry picker or helicopter? These and other ideas were discussed.

Dr. William Shiner of Slippery Rock State College is in charge of the Ecological and Conservation area where these displays and exhibits will be located. Since many of the exhibitors are from out of town, Dr. Shiner has made arrangements with the College to house them for a nominal fee of \$5.25 per day for room and meals.

To encourage the Scouts to use the Ecological area, each Scout will be issued a ticket. When a given number of holes have been punched, the Scout is eligible for prizes, such as fishing rods, reels, etc. In addition, each Scout will be issued a free Pennsylvania fishing license to use during his stay at Moraine.

To accommodate their exhibiting guests, the Scouts will issue each participant a 16'x33' tent and a 12'x16' dining fly. Electrical outlets will also be installed.

In addition to the Erie Refuge, exhibitors are:

1. Pennsylvania Fish Commission--a living stream aquarium; management of a warm water lake.
2. Pennsylvania Game Commission--habitat improvement; duck and deer pens.

3. Slippery Rock State College--Environmental Careers, Environmental Games
4. Bureau of Mines--rehabilitation of Park.
5. American Paper Institute--recycling.
6. Topographic Society--glacial interpretation, mine acid drainage.
7. Soil Conservation Service--reading the landscape.

Also participating are the National Weather Service, National Park Service, local industry, etc.

April 17, 1973.

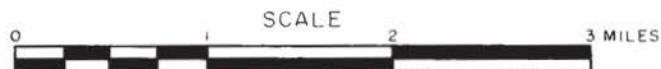
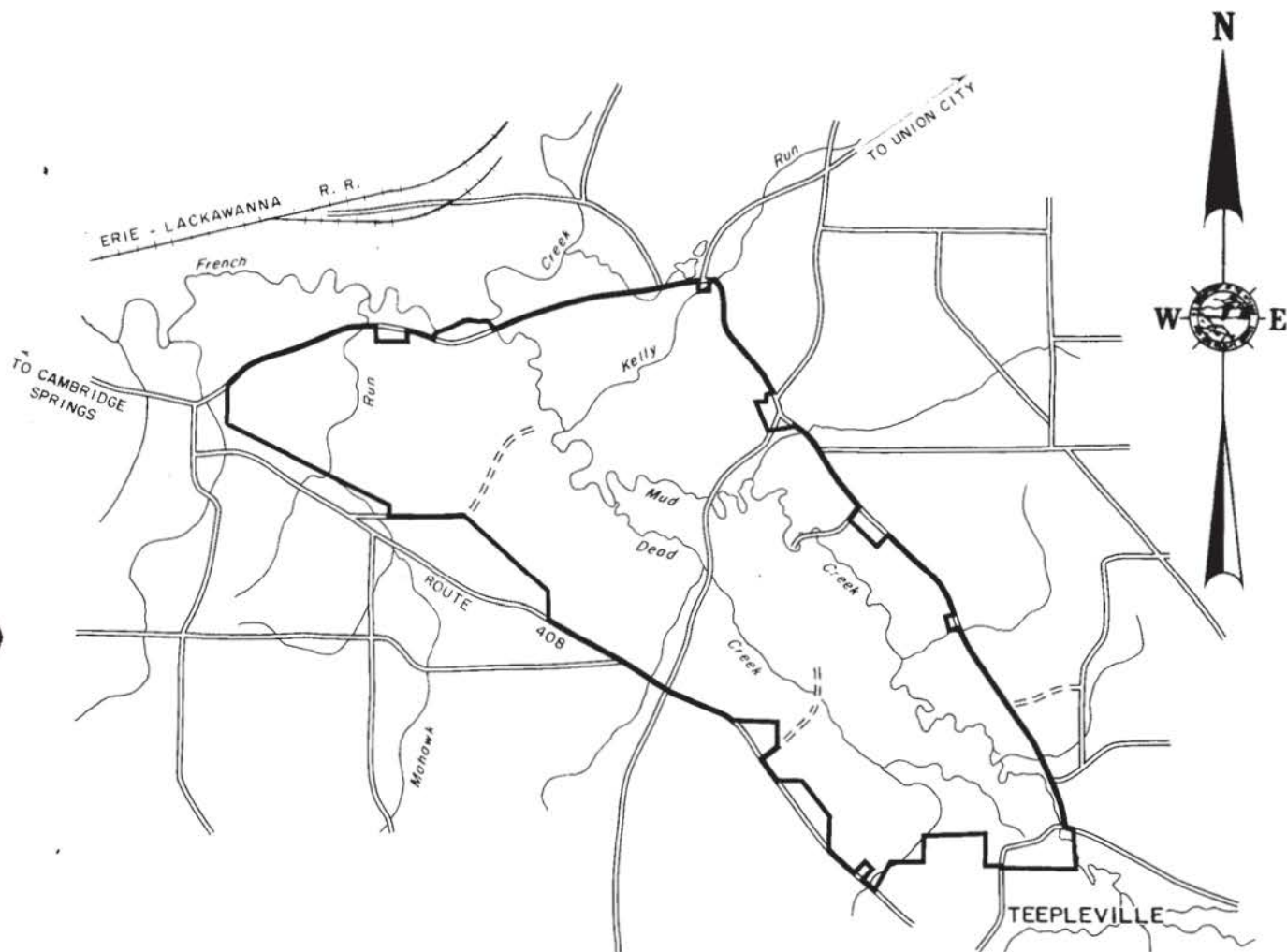
As was mentioned earlier, Rich is conducting an aquatic study of the plant and animal life in Meyers Pond, Pools K, C, and D, (see attached map), in order to determine what, if any, effect the drawdowns will have on the plant and animal life therein. Thus, the morning was spent in collecting samples. The collecting instrument is the bottom half of a wooduck nesting box with a sliding door on one end. When collecting, the instrument ($2\frac{1}{2}'$ long) is placed in $1\frac{1}{2}'$ - $3'$ of water, the door on the bottom is closed, severing the vegetation now inside the hollow tube. The vegetation and accompanying animals are then placed in a plastic bag and marked

with date, location and comments to await further analysis. Pool C, being larger, we used a canoe as a floating laboratory. To passersby I'm sure we were a strange sight, standing in cold, hip-deep water alongside what appeared to be an empty canoe. While on Pool C we checked two wooduck nesting boxes; one was vacant. The other was inhabited by a dauntless Hooded Merganser who remained on her nest during the not too smooth process of removing and then replacing the box on the pole.

The afternoon was spent on somewhat higher, but not necessarily drier ground. The Refuge has a somewhat primitive nature trail due to vandalism, trail layout, and the vagaries of Mother Nature. The few trail signposts that I saw had their messages destroyed or obliterated. A boardwalk designed to thwart horseback riders affords the visitor a dry look over a marshy area and a neighboring beaver dam. However, this soon gives way to an impassable water-logged stretch that is devoid of bridges, drains, and trail signs. This situation might be alleviated by re-routing the trail or investing some manpower in constructing another boardwalk. Fallen trees and invading brush have taken their toll on trail accessibility. This, too, can be easily remedied with a power saw, mower, and pruning shears.

APPENDIX

ERIE NATIONAL WILDLIFE REFUGE
SENECA DIVISION
CRAWFORD COUNTY, PENNSYLVANIA



LAND CAPABILITY CLASSES

LAND SUITED FOR CULTIVATION AND OTHER USES

CLASS
I

Few limitations which restrict use.

CLASS
II

Moderate limitations which may reduce the choice of plants and/or require simple conservation measures.

CLASS
III

Severe limitations which may reduce choice of plants and/or require special conservation measures.

CLASS
IV

Very severe limitations which restrict the choice of plants and require very careful management and/or conservation measures.

LAND LIMITED IN USES - GENERALLY NOT SUITED FOR CULTIVATION

CLASS
V

Severe limitations which are impractical to remove. Use is limited largely to pasture, woodland, or wildlife.

CLASS
VI

Severe limitations. Generally unsuited for cultivation. Use is largely limited to pasture, woodland, wildlife, or some recreation.

CLASS
VII

Very severe limitations. Unsuited for cultivation. Use largely limited to pasture, woodland, wildlife, or some recreation.

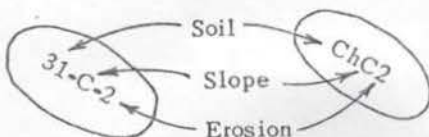
CLASS
VIII

Very severe limitations. Use is limited to watershed protection, wildlife, or some recreation.

CAPABILITY SUBCLASSES

(e) Erosion; (w) Wetness or flooding, or both; (s) Shallowness, droughtiness, stoniness, or low fertility, or a combination of these conditions.

MEANING OF SYMBOLS AND LINES ON YOUR COLORED MAP



SLOPE

- | | |
|------------------------|----------------------|
| A - Nearly level | D - Moderately Steep |
| B - Gently sloping | E - Steep |
| C - Moderately sloping | F - Very steep |

EROSION

- | |
|-------------------------|
| 1 - Slight erosion |
| 2 - Moderate erosion |
| 3 - Severe erosion |
| 4 - Very severe erosion |

DESCRIPTION OF THE SOIL MAPPING UNITS IDENTIFIED ON YOUR LAND

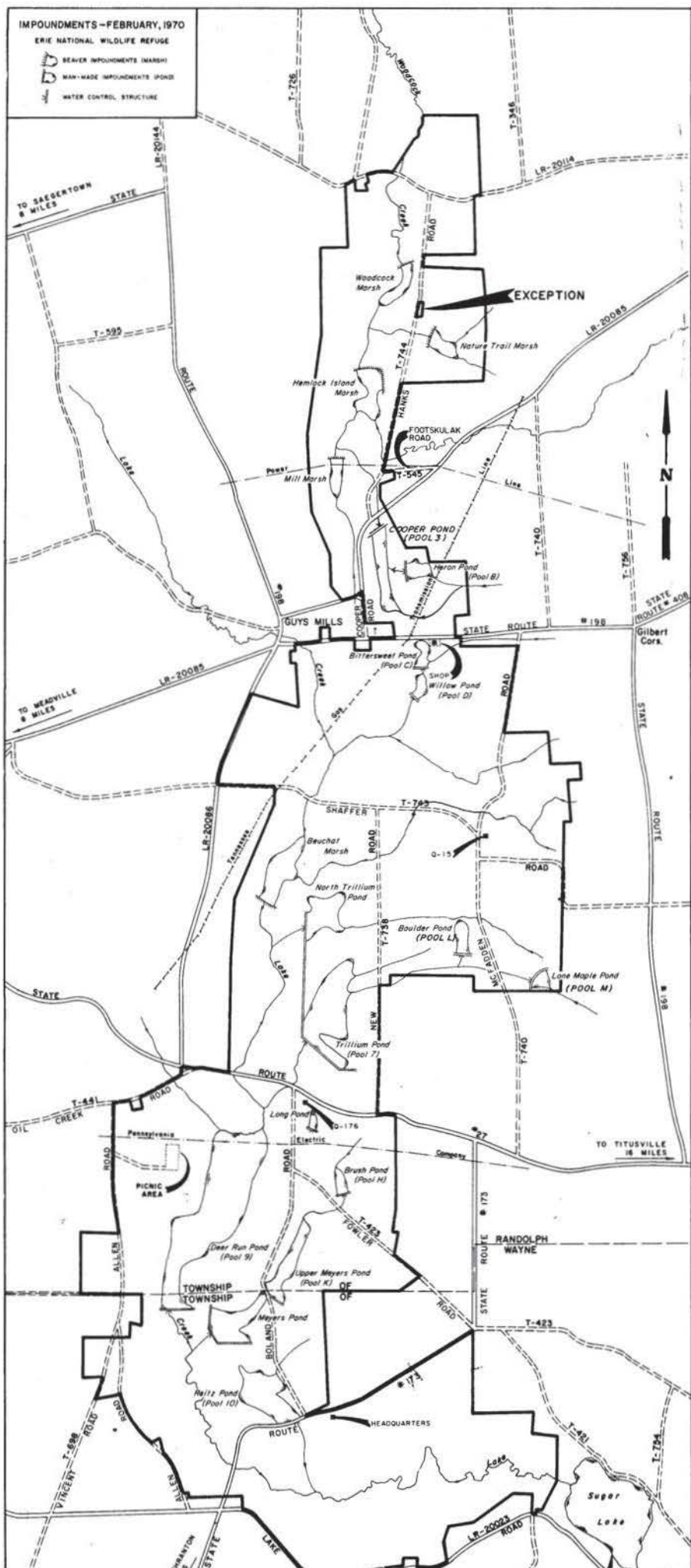
IMPOUNDMENTS—FEBRUARY, 1970

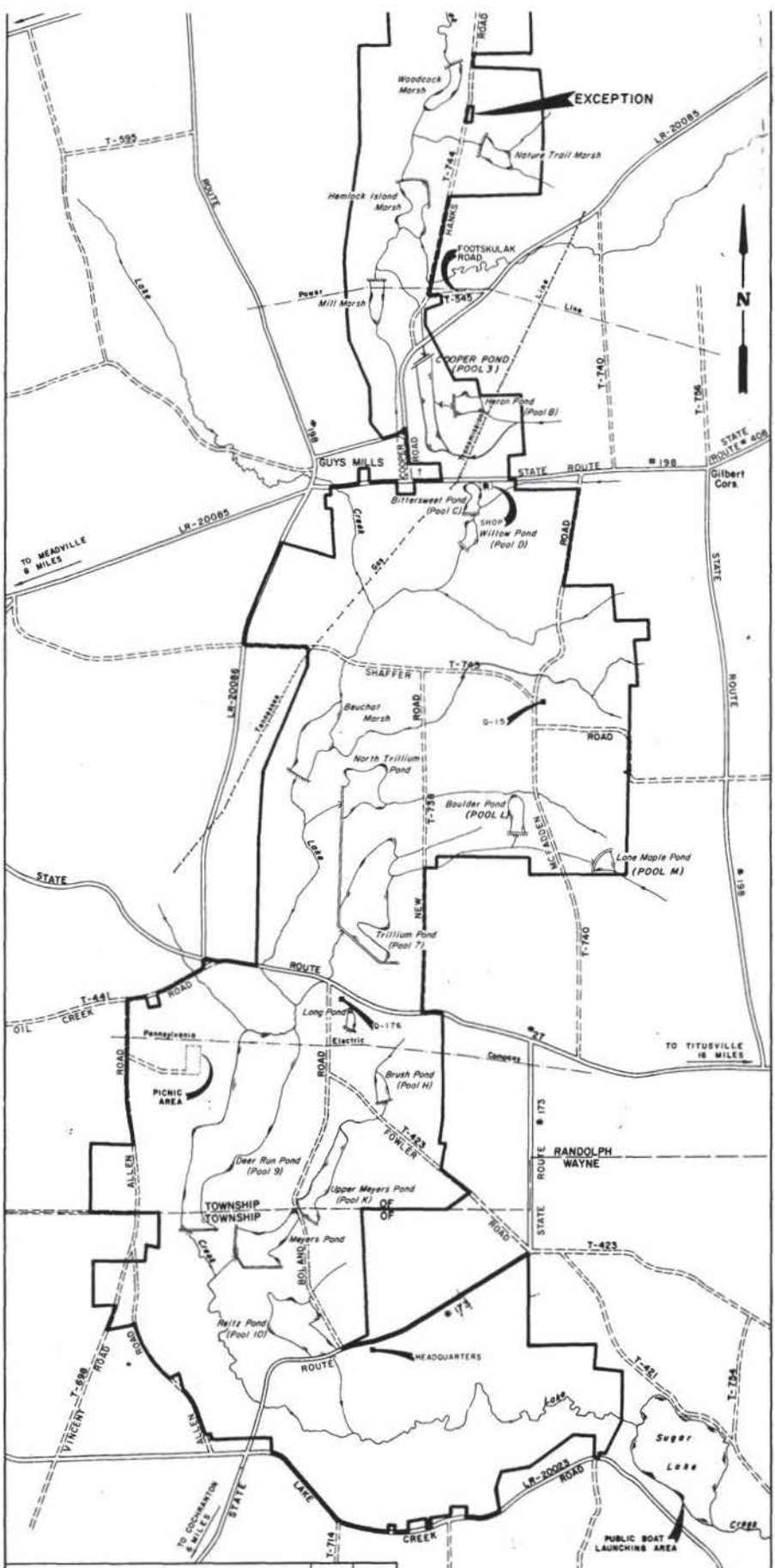
ERIE NATIONAL WILDLIFE REFUGE

BEAVER IMPOUNDMENTS (MARSH)

HAN-MADE IMPOUNDMENTS (POND)

WATER CONTROL STRUCTURE





REVISIONS		DATE	BY
UNITED STATES DEPARTMENT OF THE INTERIOR FISH AND WILDLIFE SERVICE BUREAU OF SPORT FISHERIES AND WILDLIFE DIVISION OF ENGINEERING			
SUBMITTED:	ERIE		
REVIEWED:	NATIONAL WILDLIFE REFUGE		
RECOMMENDED:	CRAWFORD COUNTY, PENNSYLVANIA		
OPERATING MAP			
REGIONAL DIRECTOR	SURVEYED:	DRAWN:	CHECKED:
W.D. APPROVAL DATE:	DATE:	DATE:	DATE:
AUGUST 4, 1966		5R-PA-523-412	

