

MASTER PLAN



**NEW
YORK**



I R O Q U O I S

NATIONAL WILDLIFE REFUGE

OFFICE

IROQUOIS

The Iroquois Indian Nation was a confederation of five tribes — Mohawk, Oneida, Onandaga, Cayuga, and Seneca. This powerful and highly-organized union dominated most of the territory between the St. Lawrence River, and the Cumberland River in Tennessee. The home of the Iroquois was here in New York State between the Hudson and Niagara Rivers. Iroquois support given to the establishment of our nation in its infancy is recognized in the name of this refuge.

IROQUOIS
NATIONAL WILDLIFE REFUGE

MASTER PLAN

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

Created in 1849, the Department of the Interior — America's Department of Natural Resources — is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States — now and in the future.

This administrative plan proposed and prepared by the Bureau of Sport Fisheries and Wildlife's Northeastern Region, Boston, Massachusetts supports and furthers the high objectives of the Department of the Interior for the wise development, management and use of the lands, waters and resources of the National Wildlife Refuge System.

John S. Gottschalk
Regional Director

PREFACE

One of the nation's greatest challenges, in the management of our natural resources, is the preservation of our wetlands. Wetlands vital to waterfowl also contribute much to the needs of many species of animals, plants, and to man.

In the thickly-populated Northeast, there are only a few remaining wetland areas available for preservation. One of these is the Oak Orchard Swamp — a water-logged area of woods, marshes, and upland located in the lakes-plain region of New York State. Federal and State conservation agencies are combining forces to purchase and preserve much of this vast wetland.

The Federal Government in 1957 was authorized by the Migratory Bird Conservation Commission to purchase the 10,800-acre Iroquois National Wildlife Refuge as nesting and migration habitat for migratory waterfowl. From funds available under the Migratory Bird Hunting Stamp Act, 8,500 acres, or 79% of the refuge, have been acquired or optioned as of early 1964. The basic authorities for administration of Iroquois Refuge are found in the Migratory Bird Treaty Act and the Migratory Bird Conservation Act.

This National Wildlife Refuge lies between two Game Management Areas administered by the New York State Conservation Department — Oak Orchard and Tonawanda. These three wetland preservation projects provide a contiguous tract of over 18,000 acres of waterfowl habitat.

Natural flooding of the Oak Orchard Swamp during the late winter and early spring annually creates a vast water area that has traditionally provided rest and food for many thousands of Canada geese and ducks of the Atlantic Flyway on their

spring migration. But, after flood waters recede, only an insignificant aquatic habitat is available for nesting waterfowl and fall migrants.

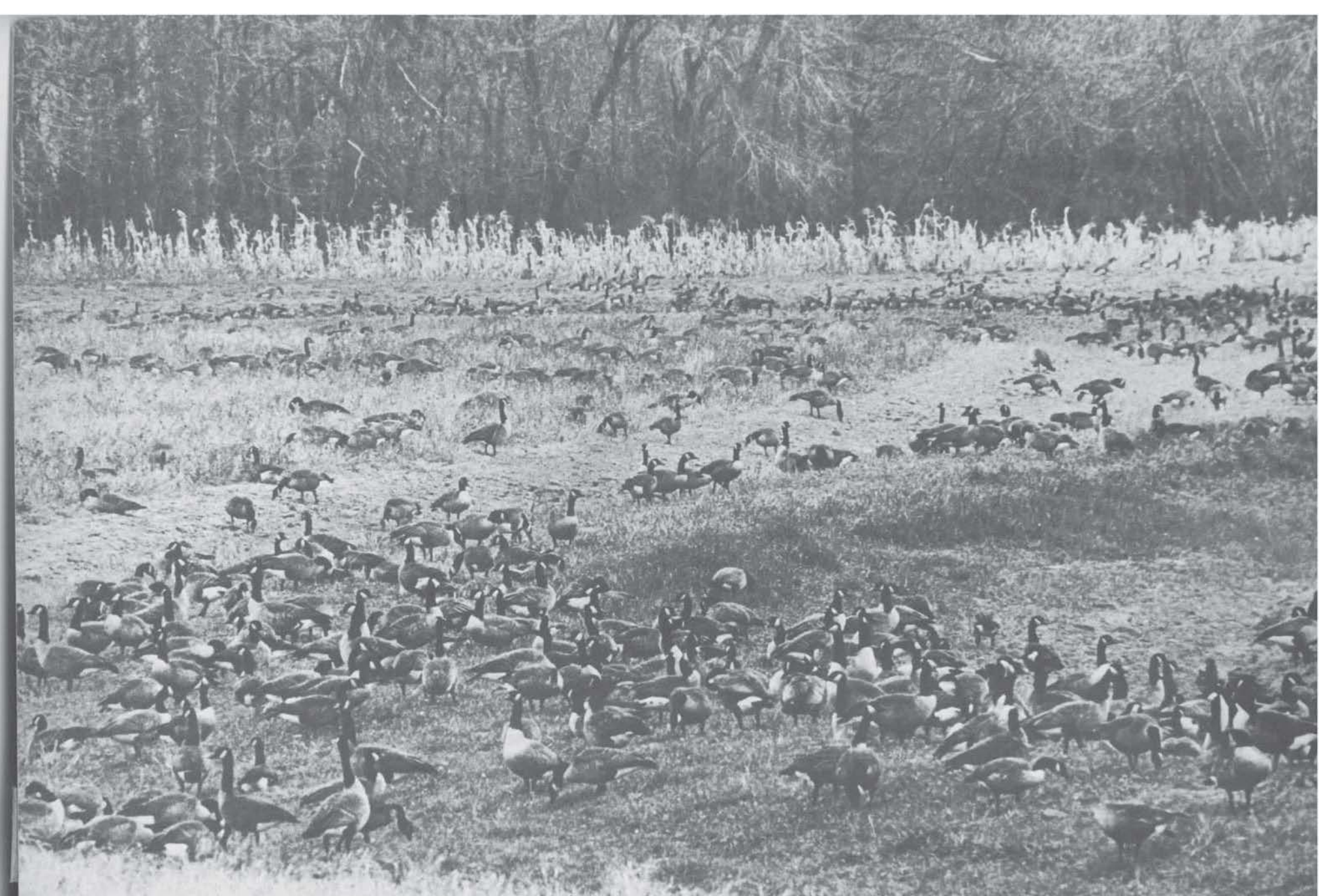
This master plan presents the development and management requirements needed to make Iroquois Refuge one of the most important breeding-migration areas in the Atlantic Flyway. The construction of dikes and water-control structures will transform wooded swamp into 5,370 acres of waterfowl marsh. Numerous upland ponds and marshes will create additional habitat. 4/13 acres.

Upland areas will be managed to produce optimum nesting and feeding conditions for waterfowl. Most of the present open land will be maintained as grassland or cropland. Cereal food crops will be grown for supplemental food.

When the Iroquois Refuge is developed, waterfowl production is expected to reach 8,000 ducks and 1,000 geese annually. Waterfowl use each year will be in the neighborhood of 1,500,000 days of duck use and 1,200,000 days of goose use.

The Iroquois Refuge is uniquely fitted and ideally located to satisfy people who enjoy wildlife and wilderness areas. With 2,000,000 people within a radius of 50 miles, public use is expected to increase from the current 30,000 to 100,000 visitor days after development. Parking overlooks, nature trails, and a visitor center will encourage public use.

The cost of this project is expected to total \$3,179,900, with land acquisition costing \$1,135,000, and development of the area costing \$2,044,900. To date an adverse land ownership pattern has limited development to a few upland ponds and marshes.



WILDLIFE - A PRODUCT OF THE LAND

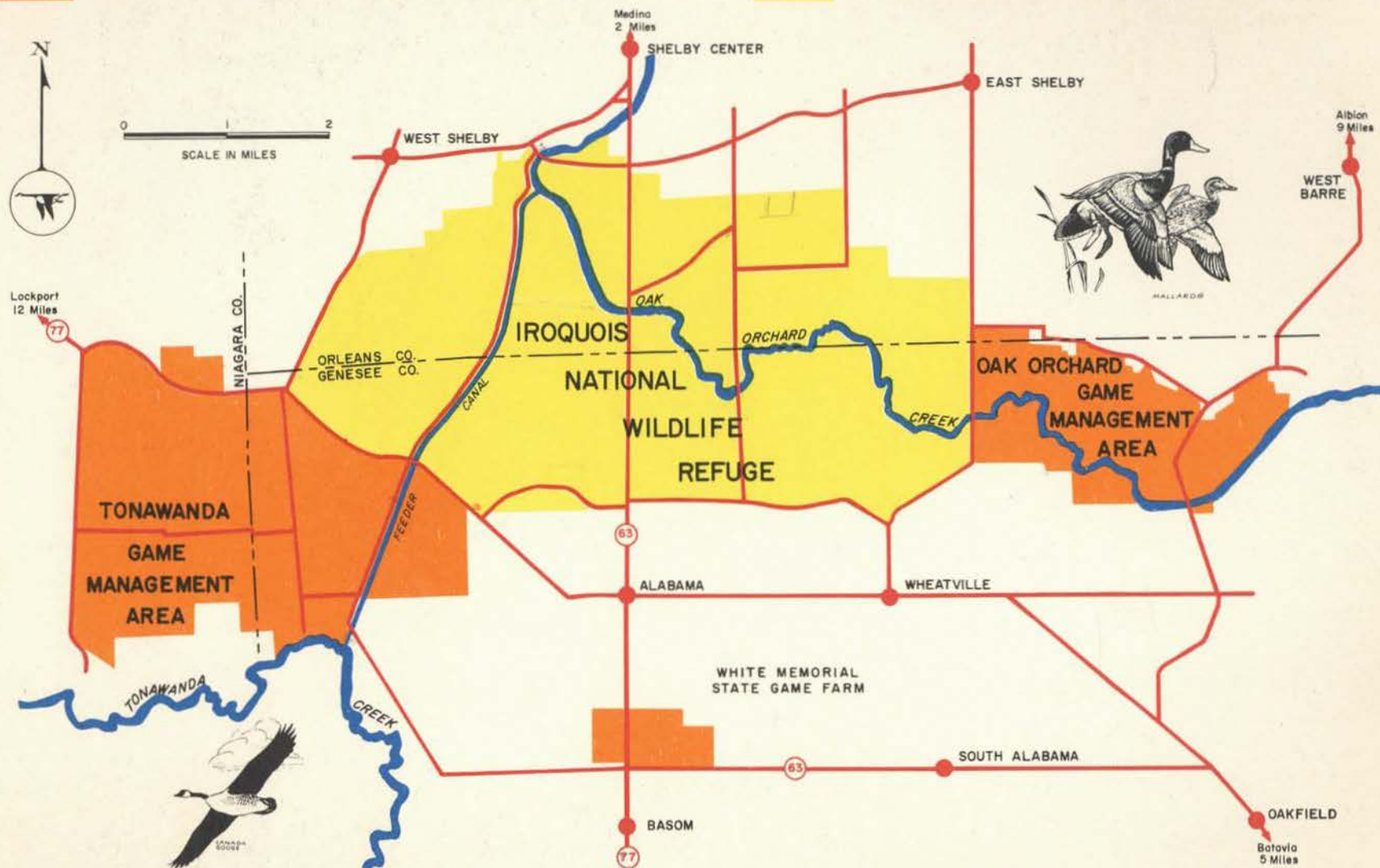
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WETLANDS FOR WATERFOWL

NEW YORK STATE CONSERVATION DEPARTMENT

U. S. BUREAU OF SPORT FISHERIES & WILDLIFE



CHAPTER 1

INTRODUCTION

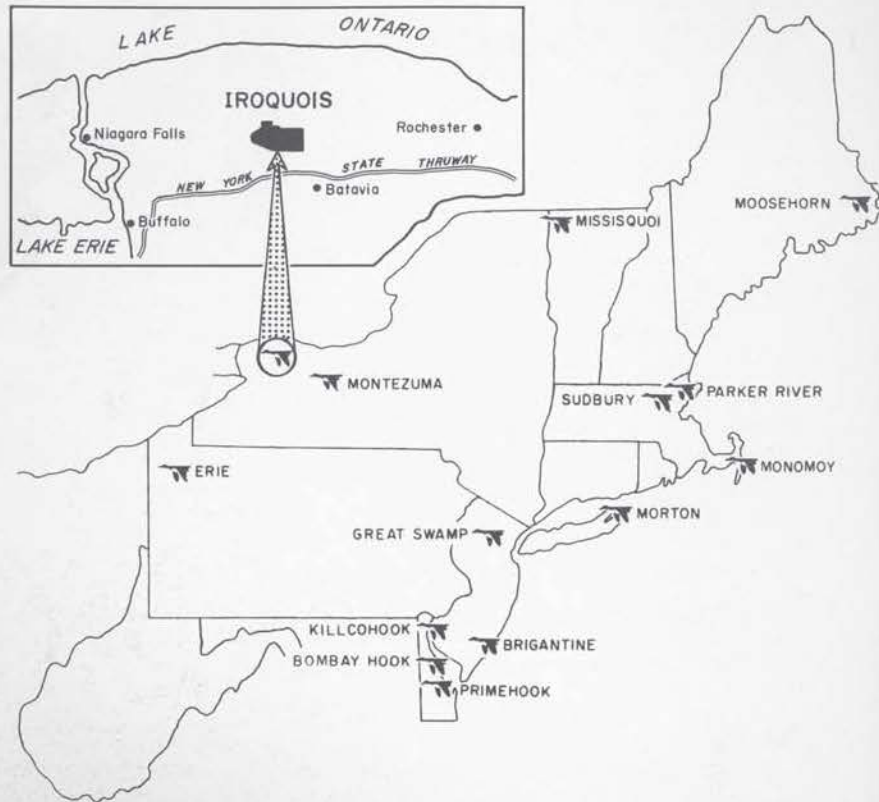
Iroquois National Wildlife Refuge, located midway between Rochester and Buffalo, in the heart of New York's lakes-plain country, encompasses 10,800 acres. Historically, the Oak Orchard Swamp has been an important stopover area for waterfowl on their north and south migrations. Natural flooding each spring shallowly inundates thousands of acres of timber and cropland. Canada geese, pintails, mallards and black ducks fill the spring skies and go northward, the stronger for their sojourn in this key wetland.

While the value of the Oak Orchard Swamp to waterfowl has long been recognized by conservationists, only in recent years has action been taken to preserve it. During the early '40's, the New York State Conservation Department acquired the 2,500-acre Oak Orchard Game Management Area. But most of this Swamp

still remained accessible to land speculators who would drain and destroy forever this wildlife haven. As Al Bromley stated in *The New York State Conservationist*, "... Time was running out at Oak Orchard as it has already run out on millions upon millions of wetland acres in this country ..."

In 1957, the situation changed abruptly. The Migratory Bird Conservation Commission approved the purchase of the Oak Orchard National Wildlife Refuge, the original name of the Iroquois Refuge. The State of New York moved to acquire 5,300 acres in the Tonawanda Game Management Area. These three areas—Iroquois Refuge, and the Oak Orchard and Tonawanda Game Management Areas—provide a tract of over 18,000 acres of ideal waterfowl habitat. This sizable bit of wild America is within an hour's drive of 2,000,000 people.





NATIONAL WILDLIFE REFUGES IN THE NORTHEAST

REFUGE IN THE FLYWAY

The Oak Orchard Swamp Area serves waterfowl using the western portion of the Atlantic Flyway. Already a major stopover for spring migrants, particularly Canada geese, this area presently receives minor use during the fall. Returns from banded birds indicate that the thousands of geese that visit the area in the spring are en route to breeding grounds east and north of Hudson Bay. The majority of the geese passing through in the fall are bound for wintering areas on Delaware and Chesapeake Bays.

There are few wetland areas on this migration route between the Atlantic coast wintering areas and the breeding grounds in Canada. When developed to provide for the needs of both spring and fall migrating waterfowl, the Iroquois Refuge will become a vital link in the chain of National Wildlife Refuges along the Atlantic Flyway.

This wetland area has in the past produced thousands of waterfowl for the Flyway. However, through the years the efforts of man to drain the Swamp have materially diminished the amount of good nesting habitat. The results of habitat improvements on the State's Oak Orchard Game Management Area prove that Iroquois Refuge will again supply to the Flyway many waterfowl, including Canada geese. The maintenance of captive flocks has restored the Canada goose as a nesting bird on both the Oak Orchard Game Management Area and the Iroquois Refuge. In addition to these public projects, 20 small marshes have been developed and 250 proposed on private lands within a 20-mile radius of the Iroquois Refuge.

Full development of Federal, State, and private wetlands promises to make this area one of the most important production and migration areas in the whole Atlantic Flyway.



Wetlands are Essential to
Migrating Waterfowl





5,000 Acres Flood Every Spring
Caused by a Natural Restriction in Oak Orchard Creek



NATURE'S WAY

This ancient wetland in the heart of one of New York State's richest agricultural regions resulted from a natural barrier across Oak Orchard Creek. Originating north of Batavia, Oak Orchard Creek drops an average of 12 feet a mile in its 50-mile passage to Lake Ontario. At Shelby Center an outcropping of dolomitic limestone resisted the cutting action of the stream, forming a natural restriction. Upstream from this block, a huge wetland was created where the creek drops only 30 feet in 25 miles. This shallowly-flooded basin through geological time periods developed into the Oak Orchard Swamp.

In its natural state this wetland is only seasonally of significant value to waterfowl. Water begins to build up in the Oak Orchard Swamp with the first winter thaws. By spring thaw time in March, water spreads over 5,000 acres of the Iroquois Refuge and thousands of other acres providing an abundance of desirable habitat for waterfowl migrating northward to breeding grounds in Canada. Flood waters recede at an increasing rate through April, leaving only scant aquatic habitat for nesting waterfowl. Drainage of the Swamp becomes nearly complete most summers, offering little habitat for southward migrating waterfowl during the fall season.

In a region where the growing season, precipitation, and soils are favorable, the gently-sloping uplands around the Swamp produce good yields of a variety of crops. Generally, these soils are poorly drained, due to a firm subsoil, high in organic matter, low in phosphorous and potash, and low to medium in lime content.

The Swamp, however, is poorly drained and a "frost-pocket." Farming here has proven to be an unprofitable venture.



Planting Date is Forever Late



Water, Water Everywhere

A GLIMPSE AT THE PAST

The Iroquois Refuge was initially a land of swamp and upland hardwoods. Seneca Indians, one of the five tribes of the Iroquois Nation, inhabited this rich area. Food was no problem. The woods and waters abounded with game and fish. The Swamp was a mecca for a host of waterfowl each fall and spring.

Garden plots were cleared by the Senecas in such a manner that the remaining large oak trees near their villages presented the appearance of an orchard of oaks. Thus, the first white men to the area applied the name "Oak Orchard."

Early logging operations cleared most of the virgin swamp timber. The Swamp today supports stands in varying stages of maturity.

The white settlers cleared an estimated 4,800 acres of the upland timber for agricultural purposes. These upland areas

supported many subsistence family farms producing a variety of crops and livestock, characteristic of that day. Progressively, in trend with the times, fewer farmers specialized on larger acreages.

The rich black soils of the Swamp have long tempted man. Many drainage schemes have been proposed, starting as early as 1828. About 150 acres of the Swamp were cleared for muck crop farming. Piecemeal drainage operations proved ineffective, and plans to drain the whole Swamp proved too expensive. The high cost of draining the Swamp has been instrumental in preserving this wetland resource.

At the time the Refuge was established, surviving agricultural enterprises were dairy farming, muck crop farming, and beef cattle production.



Farming is a Gamble

Located seven miles south of the former Erie Canal and the present-day Barge Canal, Oak Orchard Swamp bears the mark of early canal development. To augment the volume of water in the Canal, the Feeder Canal was dug in 1823-1825 to force water from Tonawanda Creek into Oak Orchard Creek. In two ways, this project adversely affected the Swamp: The Feeder Canal functioned as a drainage ditch; the stream channel through the bedrock between the Swamp and Shelby was cut four feet lower, permanently dropping the water level in the Swamp.

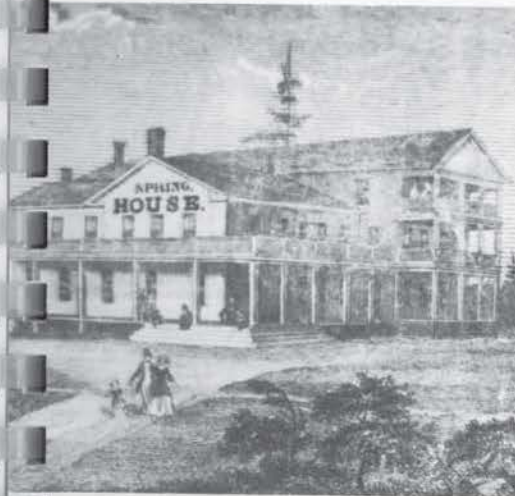
Oak Orchard Creek has no tie-in with the present Barge Canal. It is carried over the Creek on an aqueduct at Medina. The Feeder Canal was abandoned about 1910 and later plugged off at Tonawanda Creek. Left to fend for itself, it surrendered long ago to the forces of nature. It exists today as a remnant of our historical past.



Feeder Canal

A flourishing enterprise in the Swamp during the mid-1800's was the exploitation of the Sour Springs. The Sour Springs are still found on slight rises in the Swamp west of Sour Springs Road. Indians learned that cuts or wounds, bathed in this sulfur water, seldom became infected. During the period 1848-1880, many people marketed the water from these springs as a "cure-all" or "tonic" for many human ills. It is claimed that up to 25,000 bottles of this water were shipped annually at the height of activity.

A 37-room hotel, the Spring House, was erected in 1848 near the springs, and operated initially as a spa. With a large dance hall, it was the center of social life in the area. The owner of the Spring House in 1914 is reputed to have collected the value of the fire insurance when the building, on a starlit night, was struck by lightning and burned to the ground.



The Historic Sour Springs



THE GOAL - YOUNG DUCKS AND GEESE

CHAPTER 2

OBJECTIVES

WILDLIFE RESOURCES

All National Wildlife Refuges have one principal objective — to preserve wildlife for people to enjoy now and in the future. Like man, wild creatures must have water, food, cover, and living space. The abundance, interspersion and infinite variety of these essentials of life on the Iroquois Refuge account for the numerous birds and mammals found there.

The primary purpose of this Refuge is to provide a breeding-migration area for waterfowl. All species of waterfowl that migrate along the western limits of the Atlantic Flyway presently utilize this wetland area for feeding and resting during their flights to and from southern wintering areas and northern breeding grounds. Five species of ducks nest here.

But waterfowl use will change dramatically when this wetland is developed. What is now only a mediocre-quality wetland for waterfowl will become one of the most important waterfowl areas in

the Flyway. Production of Canada geese and ducks will increase manyfold. Ideal food and water conditions will attract many more fall migrants.

While emphasis is on waterfowl, management will strive to preserve and enhance environments of an interesting variety of migratory birds and indigenous wildlife. Many shorebirds, gulls, terns, and other marsh and water birds migrate through, and several species nest here. Woodcocks are nesters and use this area during migration. Mourning doves are here year-round. Other common birds include hawks, owls and songbirds.

The resident fauna reflects a wide range of habitat types. Ring-necked pheasants and ruffed grouse are common. The bob-white quail has recently been introduced. Common mammals include the white-tailed deer, muskrat, beaver, mink, raccoon, red fox, opossum, skunk, cotton-tail rabbit, and red and gray squirrels.



The Canada Goose will be Reestablished as a Nesting Bird

DUCKS

Duck utilization within recent times has been limited predominantly to the spring migration season, due to the absence of developed water areas and the prevalence of water only during the spring flood period. The pintail, baldpate, mallard, black duck, blue-winged teal and wood duck make good use of spring-flooded cropland and swampland. Little water area is available in the fall, but these species plus the green-winged teal are present in limited numbers.

In the undeveloped state, duck utilization on the Iroquois Refuge has fluctuated between 100,000 and 400,000 use days a year. When the potential waterfowl habitat is developed, creating optimum conditions for both spring and fall migrants, duck use is expected to reach 1,500,000 use days annually.

Duck production has been erratic, averaging 450 young annually. Successful

use of the swampland by nesting ducks has been dependent upon the length of time the Swamp holds water. Production is higher in years when the spring runoff is good, and adequate rainfall occurs through the spring and early summer months. Current nesters are the mallard, black duck, blue-winged teal, and wood duck in about equal number. Occasionally, a hooded merganser brood is observed.

The potential for increasing duck production, by retention of flood waters in shallow pools, is tremendous. The developed pools on the Oak Orchard Game Management Area have demonstrated that production will increase significantly. Ducks not now nesting on the Iroquois Refuge — green-winged teal, pintail, ruddy duck, redhead, shoveler and gadwall — will be attracted. To promote maximum production in these pools, nesting islands as well as nesting forms and boxes will be erected. An ultimate production of 8,000 ducks is anticipated.

CANADA GEESE

To many local wildlife enthusiasts, Oak Orchard Swamp means Canada geese. About 7,000 acres of flooded field and woodland entice peak populations of 50,000 Canada geese during the month of April. When flood conditions are right, up to 40,000 geese are on the Iroquois Refuge. Snow and blue geese incidentally frequent this area.

Fall goose usage has been much less spectacular, due to the lack of water. The developed pools of the Oak Orchard Game Management Area accommodate most of the fall migrants. Prior to the hunting season, concentrations of from 5,000 to 10,000 geese use this area.

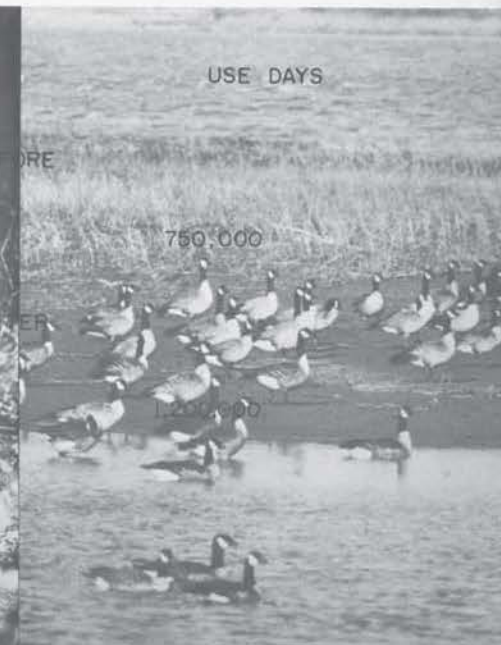
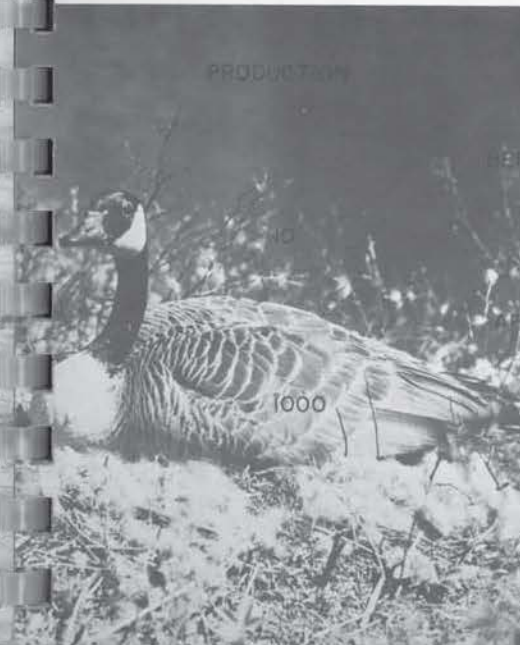
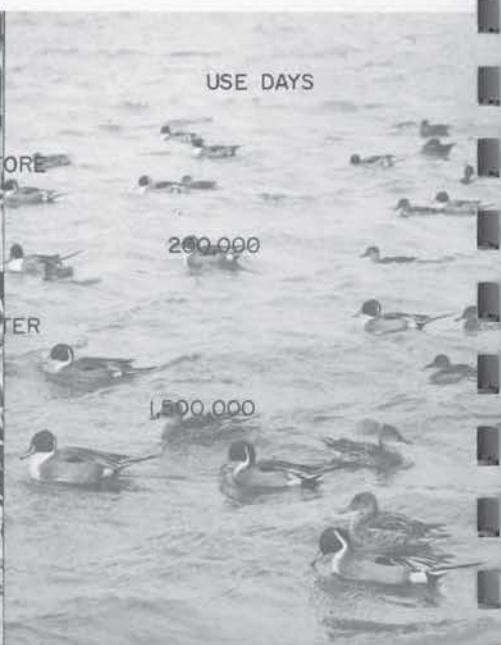
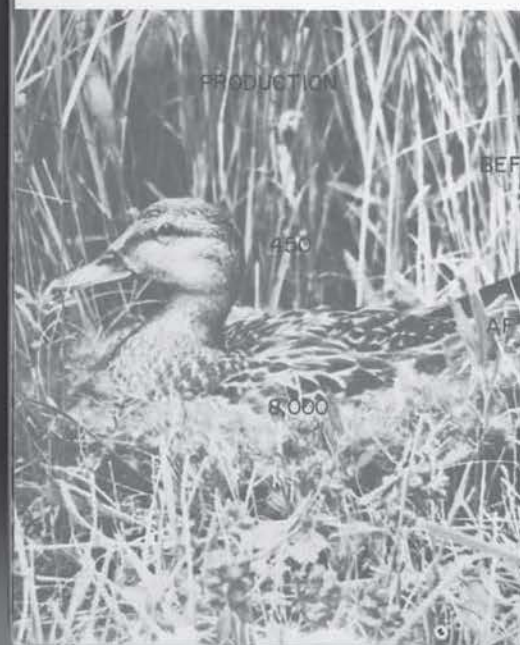
When the Iroquois Refuge is developed, providing habitat for both spring and fall migrants, goose utilization should increase from the present 750,000 use days annually to about 1,200,000 use days.

The Canada goose was eliminated as a

nesting species early in the settlement of this area. Reestablishment of a nesting population is progressing on both the Iroquois Refuge and the State areas by the captive-flock method. Goslings raised in fenced ponds have been released after three years when they are sexually mature. These released birds have nested in the wild.

In 1963, the Oak Orchard Game Management Area, where good natural habitat has been created, had 31 pairs of geese nesting in the wild, producing over 95 goslings. Five pairs, from fewer releases, nested on the Iroquois Refuge. Releases of captive-reared geese will continue until this majestic bird has become well established as a nesting species.

Lack of nesting habitat is now the limiting factor. Goose production will soon level off until more marsh is developed. A production goal of 1,000 goslings should be reached.



WHISTLING SWAN

The presence of whistling swans in the Oak Orchard Swamp, in late March or April, provides a special treat to many thousands of nature lovers. These stately birds stop to rest and feed on flooded fields en route between wintering grounds in Virginia and North Carolina to their ancestral breeding grounds far to the north on the arctic coasts of Canada and Alaska.

Use of Iroquois Refuge by swans is



limited to the spring migration and has been erratic. One appearance of 400 of these relatively rare birds in the area created traffic jams on the normally quiet roads bordering the Swamp as hundreds of people came to see this stimulating sight.

The whistling swan may make more regular use of the Oak Orchard Area for its spring stopover once the Iroquois Refuge is developed.

BALD EAGLE

The persistent decline of the bald eagle, nationwide, is of major concern to conservationists. The bald eagle, a denizen of dwindling wilderness areas, is rapidly becoming a rare bird.

Other timbered swamps, like those on the Iroquois Refuge that have been converted into waterfowl marshes, have provided the bald eagle with the remoteness from human intrusion it requires. It is hoped that this bird, selected for its fierce beauty and proud independence as our national emblem, will some day inhabit the Iroquois Refuge.

WATER AND MARSH BIRDS

About 20 species of water birds will frequent the refuge when developments for waterfowl create suitable habitat. The coot, common gallinule, pied-billed grebe, green heron, American bittern, least bittern, sora, and Virginia rail are common nesters now. Horned grebes, common egrets, and glossy ibises frequently add interest by their presence.



SHOREBIRDS, GULLS AND TERNS

Ardent birdwatchers will be particularly interested in this group of birds that will be attracted in increasing numbers after development. The killdeer and spotted sandpiper are common nesters. The common and black terns will nest in managed marshes. Some 25 other species of this intriguing group of birds will be attracted during migration.



WOODCOCK

Quiescent during the day, the woodcock usually goes unnoticed. But actually, this migratory bird, with its fascinating nocturnal breeding behavior, is a common nester. Needing fields reverting to brush and scattered hardwood trees, certain fields will be maintained in open brush condition for this elusive game bird.



MOURNING DOVE

The mourning dove, present all months of the year, is a very common nester in trees and shrubs. Evergreen trees are favored early in the season. Windbreaks, wildlife hedges, and spot plantings of evergreens will furnish additional nesting sites. This prized game bird will also benefit from small grains grown for waterfowl.



UPLAND GAME BIRDS

The ring-necked pheasant with an average population of 300 is the only common upland game bird. The number of ruffed grouse remains stable, but low, due to limited habitat. Bobwhite and wild turkey have been introduced.

Only a minor amount of upland game-bird habitat will be lost with development of water areas. Management for interspersed cropland with grassland and brushland will improve conditions for the pheasant. Public hunting of this species will be permitted.

DEER

The number of white-tailed deer, the only big game animal, has fluctuated between 100 and 400. Deer are often seen by refuge visitors, but most of them leave the refuge in winter, due to early flooding, and concentrate on higher ground to the east.

Developments for waterfowl will improve food and cover conditions for deer. Hunting in cooperation with the New York State Conservation Department will maintain a herd of no more than 300 deer.

FURBEARERS

Furbearing animals, in order of importance, are the muskrat, mink, raccoon, beaver, fox, skunk, opossum and weasel. Under present conditions of drastic fluctuations in water level, relatively few muskrat, mink and beaver are annually trapped. Development of the refuge will create new habitats for these valuable animals, particularly the muskrat.

Where necessary, the muskrat will be managed to maintain emergent vegetation at optimum density for waterfowl. Predator species will be controlled when necessary.



LAND AND WATER RESOURCES

The achievement of refuge wildlife objectives, emphasizing waterfowl, is dependent on full development and management of each acre of land. A wildlife refuge is a farm specifically for wildlife. For example, just as the land of a dairy farm requires a particular management, a specialized land use is necessary on a refuge.

Concerned with a variety of wildlife species, each with a peculiar niche, five

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

The following table shows the current acreage of these five habitat types and the acreage after the Iroquois Refuge is completely developed:

	LAND USE ACREAGES	
	Before	After
Marsh and Water	200	5,500
Cropland	500	550
Grassland	2,000	2,430
Brushland	250	250
Timberland	7,850	2,070
	10,800	10,800



MARSH AND WATER

For a brief period each spring, the Iroquois Refuge has an abundance of water when 5,000 acres are naturally flooded. During the late summer and fall, there are less than 200 acres of permanent water and marsh. More marsh and water area is obviously essential to attain refuge waterfowl objectives.

A system of dikes and structures will permit the retention of spring flood waters and summer precipitation, creating 5,370 acres of water in six large pools. In time, bulrushes, cattail, sago pondweed and other aquatic food and cover plants will take over these shallow impoundments.

Timbered swamp, with low wildlife populations, will be converted into marsh where waterfowl will find ideal nesting conditions; both spring and fall migrating waterfowl will be attracted by an abun-

dance of food and cover, and a host of other birds and mammals will benefit.

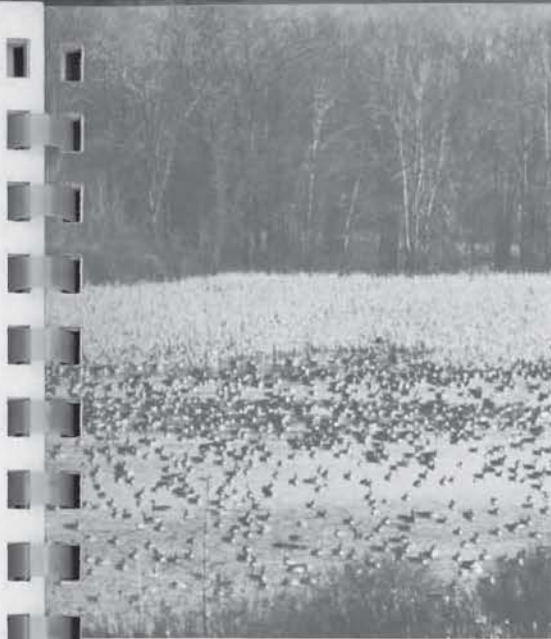
In addition to these main pools, nine upland ponds and numerous small pot-holes will be constructed in grassland areas improving this large habitat type for nesting ducks.

Optimum water levels in all water areas will be maintained during the waterfowl nesting and brooding season. During the summer and fall, lower levels will encourage aquatic food production providing ideal conditions for fall migrating ducks and geese.

Prior to freeze-up early in December, most water areas will be extensively drawn down to provide storage space for flood waters. This winter drawdown will minimize a potentially serious carp problem. Water levels will be maintained during the winter where muskrats are needed to improve aquatic habitats.



This is the Type of Marsh That Will be Created



Cropland for Food

GRASSLAND

This habitat type is of value to waterfowl in two ways—as duck nesting cover, and food for geese. Presently, there are 2,000 acres of grassland. When the refuge is completely developed, 2,430 acres will be managed as grassland.

Grasslands bordering water areas will be maintained in optimum condition for nesting waterfowl. Local farmers will be permitted to pasture cattle or harvest hay. Periodically, mechanical or chemical control of weeds and brush will be necessary.

Grasslands maintained as goose-browsing areas require a different treatment. Adaptable legume-grass mixtures preferred by geese will be seeded after application of lime and fertilizer. Haying and grazing will be used to keep these plantings green and succulent.

CROPLAND

Sufficient crops will be planted to attain waterfowl utilization goals during the fall and spring migration, and to alleviate depredation by waterfowl on adjacent private lands.

Based on soil capability, 550 acres of land have been selected as cropland. Currently mostly in grass, this land will be managed as grassland until needed for waterfowl management. Small food plots will also be planted, specifically for upland game species.

Buckwheat, corn, millet, barley and wheat, in rotation with grasses and legumes, will be planted following approved soil and moisture conservation methods. Plowing on the contour and strip-cropping will prevent soil loss. All soils, deficient particularly in phosphorus and potash, will have to be fertilized.

Local farmers will be encouraged to cooperate in a sharecrop program.



Grassland for Nesting

BRUSHLAND

Scattered over the refuge are 250 acres of abandoned cropland, old orchards, and hedgerows in various stages of reversion. These brushy areas will be maintained primarily as habitat for upland game species, woodcock, and songbirds.

To keep these areas in open-brush condition, brush will be spot-cleared and large trees excluded. Some areas will be improved by plantings of low evergreens and food-producing shrubs.

UPLAND TIMBERLAND

The remaining 2,500 acres of upland timber, now interspersed in numerous small wood lots on poorer soils throughout the refuge, will be managed primarily for wildlife rather than timber production. Minor thinning, spot-clearing and other practices will keep these second growth stands as ideal habitat for deer and other resident wildlife.

A natural area, containing some exceptionally large specimens of beech, black cherry and hemlock, will be preserved for people to enjoy.

SWAMP TIMBERLAND

This is the principal type that will be inundated by pools developed for waterfowl. Elms, soft maples and other swamp trees will gradually be eliminated, giving way to aquatic plants. Over 5,000 acres of swamp timber will disappear.

A portion of this unique type will be preserved. Several hundred acres of swamp timber along Oak Orchard Creek will be left in the primitive state. In the years to come, people will be able to visit this wilderness to enjoy what was once a common habitat in the Northeast.



RECREATION

The Bureau of Sport Fisheries and Wildlife is keenly aware of the increased recreational need of the American public resulting from more leisure time, improved transportation facilities, and higher living standards. While the primary purpose of all National Wildlife Refuges is the perpetuation of wildlife and the safeguarding of wildlife habitat, the Iroquois Refuge is uniquely attractive to people who enjoy getting out in marshes, woods, fields, and streams where a variety of wildlife can be seen.

Already over 30,000 visitors are attracted each spring to view the large concentrations of waterfowl in the refuge area. Several large parking overlooks will be developed to accommodate this ever-increasing traffic. Self-guided nature trails will be established where a diversity of plants and wildlife can be ob-

served, studied and photographed.

A visitor center will be built on a ridge overlooking an impounded marsh, an undisturbed dense swamp, and upland ponds in a meadow. Here, exhibits will dramatize conservation principles, explain the ways of nature, and illustrate Bureau programs. In an auditorium, regular programs will be given on a wide range of conservation subjects. Guided tours of the refuge will be conducted for civic and nature organizations, youth groups and school children.

In cooperation with the New York State Conservation Department, there will be a coordinated public hunting program of waterfowl, upland game, and deer on the Iroquois Refuge and the Oak Orchard and Tonawanda Game Management Areas. Public fishing will be permitted at certain places on Oak Orchard Creek.



Nature-oriented Recreation will be Enhanced



Before



After

CHAPTER 3

DEVELOPMENT

Oak Orchard Swamp has been a problem to man. It will be a paradise for waterfowl. Futile attempts through the years, to drain and farm this wetland wilderness, indicate that its best use is for a waterfowl marsh.

Thousands of ducks and geese visit the flooded woods and fields during the spring migration. Shortly thereafter, and for most of the year, the Swamp is truly idle land — too wet to cultivate and too dry for optimum waterfowl use. Even resident wildlife avoid much of the dense swamp woodland, preferring edges between the Swamp and upland fields.

Attainment of refuge objectives in the production of waterfowl and in fall migrational use requires water areas far in

excess of those that occur naturally through the late spring, summer and fall. Construction of a system of dikes and water-control structures will impound 5,370 acres, creating an ideal environment for nesting waterfowl and spring and fall migrants.

Development of marshes along with the management of cropland, grassland, and timberland will make Iroquois Refuge an outstanding waterfowl area and a haven for a host of other wildlife.

To manage these wildlife lands and waters properly, access roads, trails, fences, signs, and a complete headquarters will be required. A visitor center, parking overlooks and nature trails will be recreational developments.



Dikes to Create 5,370 Acres of Waterfowl Marsh are Planned



0 1/2
SCALE IN MILES

IROQUOIS NATIONAL WILDLIFE REFUGE

DEVELOPMENT PLAN

- MARSH & WATER
- CROPLAND
- GRASSLAND
- UPLAND TIMBER
- SWAMP TIMBER
- DIKES
- NATURE TRAILS

77

77

63

OAK ORCHARD CREEK

VIRGIN HARDWOODS

OAK ORCHARD CREEK

VISITOR CENTER

REFUGE HEADQUARTERS

SOUR SPRINGS

5
600
776

60
510
380

4
510
1370

3
612
510

2
600
660

1
600
660

A

B

G

H

D

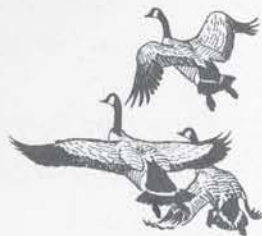
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C

WATER FACILITIES

Development of water-control facilities will be required to transform wooded swampland into waterfowl marsh. This will permit the retention of the spring runoff through the waterfowl nesting season and the fall migration period.

The topography of the area makes practical the establishment of six major pool units utilizing water from Oak Orchard Creek. Development to create these major pools will consist of 14 miles of earthen dike and 16 water-control structures.



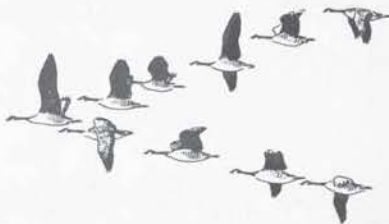
Water in all units will be drawn down extensively at the end of the fall migration period and held at a low level, or drained through the winter. This is for the purpose of accommodating flood waters of late winter and early spring that presently and historically are adequate to charge all water units even in the driest years. This practice further promises to preclude the development of a carp population so troublesome on some waterfowl management areas.

Spring recharge of water units will occur prior to or simultaneously with the spring waterfowl migration as has happened naturally in the past. When spring flood waters start to drop, water-control structures will be closed, trapping the spring runoff to provide an ultimate of 5,370 acres of shallow water through the nesting season.

Natural precipitation will help maintain pool levels. If additional water is needed through the summer and early fall, water will be pumped from the creek into the upstream impoundments and transferred by gravity to the lower units.

All water units are provided with independent water inlets and drains to permit maximum flexibility in management. Individual units may be drained while other units are held at normal pool level. Pools may be drained after the nesting season for vegetation control, clearing of timber, planting of supplemental food, and construction of nesting islands.

Drawdown of the pool system for the winter will commence before freeze-up — before the end of the fall migration. Upstream units will be drained first, leaving the lower pools for late fall migrants.



Nine upland ponds or marshes, ranging in size from five to forty acres, will be developed. Numerous small potholes or dugouts will be bulldozed within grassland areas. These ponds and potholes will be of high value in increasing waterfowl nesting and in dispersing migratory flocks more widely throughout refuge cropland and grassland.



Dikes and Water Control Structures Permit Water Management Transforming Wooded Swamps Into Highly Productive Waterfowl Marshes



BUILDINGS

All of the existing buildings in use at Iroquois Refuge were acquired with the land. Former farmhouses and attendant storage buildings have been adapted for interim use as office, shop, storage of equipment, and as residences. Fifteen such buildings widely scattered about the refuge are currently utilized on a temporary basis.

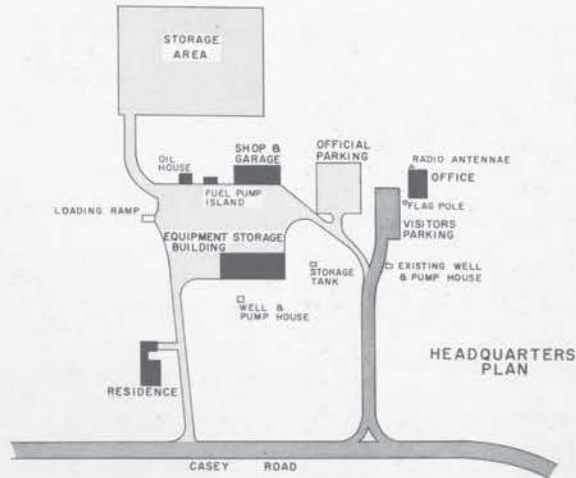
Efficient administration of the refuge requires establishment of a headquarters site where building facilities and the storage of equipment will be consolidated. Most of the existing buildings being utilized are antiquated, poorly located, and are not well adapted to refuge needs.

Present housing consists of three renovated farm dwellings. These quarters plus a new residence to be located at the headquarters site will provide housing for per-

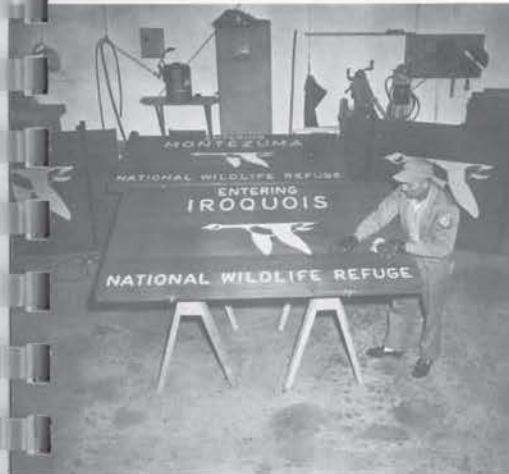
sonnel subject to transfer, and assure protection of wildlife and Government property.

The proposed headquarters layout will be comprised of a refuge office to accommodate five staff members; combination shop and garage; equipment storage building; oil, paint and farm supply storage building, and one residence.

A visitor center will be constructed at another site where a variety of refuge habitat can be viewed. Facilities at the visitor center will accommodate the visiting public as individuals or groups. The visitor center will contain an auditorium with automatic projection equipment; a display area for mounted specimens, dioramas, and maps; office and work space for the refuge ranger in charge, and sanitary facilities for the public.



Roads will be Graveled



Rustic Signs will Greet the Public

ROADS AND TRAILS

A system of roads and trails will be constructed to provide access for operation and maintenance activities. Eleven miles of road will be graveled to permit all-season access to water-control structures. There will also be 12 miles of trails on dikes and elsewhere to provide access to farming and other operational sites.

A number of public roads passing through and bordering the refuge will provide access to all public use sites.



FENCING AND POSTING

Robert Frost's poem, *Mending Wall*, contains much wisdom in the line "Good fences make good neighbors." The refuge boundary will be identified with a four-strand barbed wire fence where the refuge abuts private farm holdings. Required are 13 miles of boundary fence, and 11 miles of interior fence where cattle will be grazing grasslands. Standard refuge signs will be posted on 35 miles of boundary. Twelve entrance signs and many advisory and directional signs will be erected.

RECREATION FACILITIES

Many features of lands and waters on National Wildlife Refuges are of recreational interest to the public. Recreational opportunities at Iroquois Refuge will include those associated with the primary objectives of the area, such as sight-seeing, nature study, photography, hunting and fishing. Certain developments are required to accommodate and enhance public enjoyment without unduly disturbing the wildlife values of the refuge.

Parking overlooks will be developed at strategic locations for sightseers who come to view waterfowl concentrations. Low observation platforms are planned to improve certain vantage points.

Nature trails will be provided in primitive, as well as developed, portions of the refuge. Here, plant and animal life can be observed, photographed, and studied. Self-guided tours along these trails can

be made by groups or individuals through a variety of habitat, including a mature northern hardwood forest, swamp hardwoods, and developed marshes.

Numerous signs and exhibits along these trails and at all parking areas will assist the public in appreciating nature and the value of wetland.

A visitor center will contain exhibits featuring wildlife conservation, collections of local nature lore, maps and photos of refuge wildlife and programs. An auditorium will be used for regular slide and motion picture presentations during the tourist season, and for talks to visiting groups. A small lunch area will be available for the use of visitors.

Parking areas, in addition to those located throughout the refuge for other recreational uses, will be the only development required to manage public hunting and fishing activities.



Visitor Center at Seney Refuge in Michigan

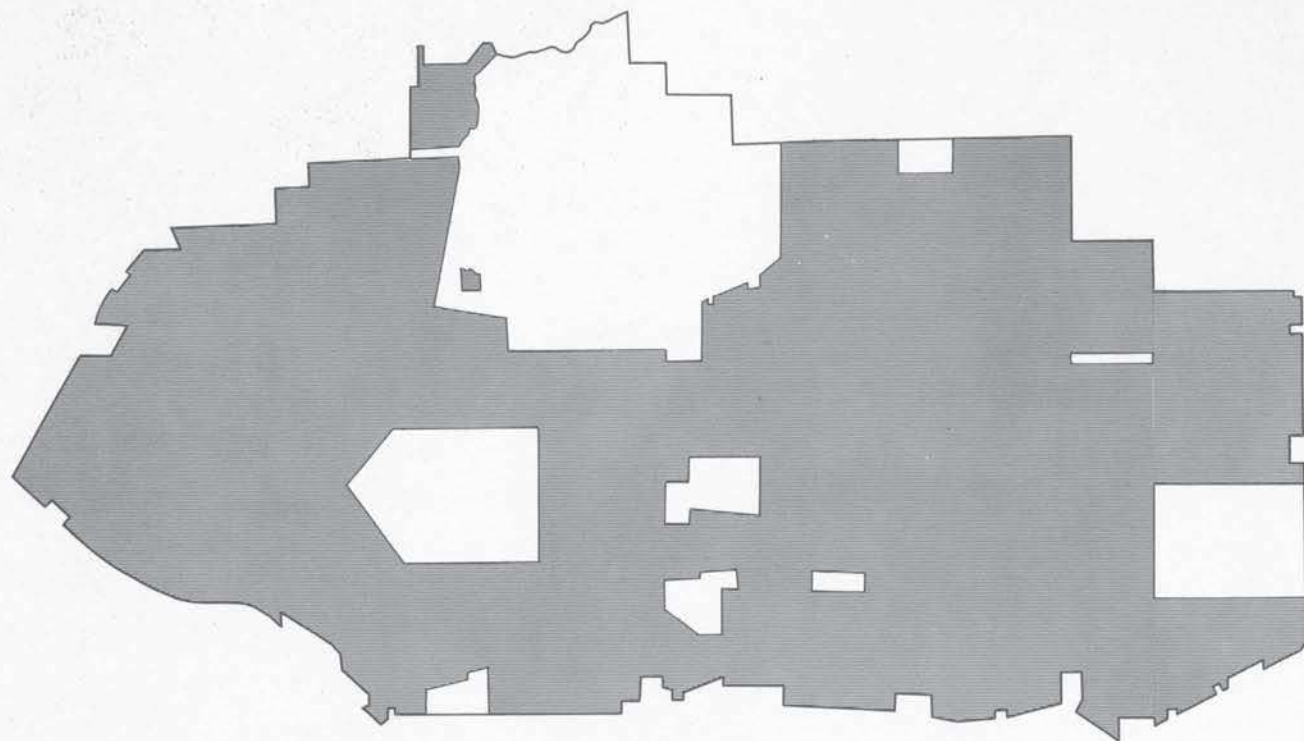


Parking Overlook to View Waterfowl Concentration



Self-Guided Nature Trail

LAND STATUS MAP



LANDS OWNED AND OPTIONED



LANDS TO BE PURCHASED

ACQUISITION

For years, man has faced problems in attempting to convert portions of this natural wetland to agricultural production. In this day, when a bountiful agriculture poses a problem of over-production, the dedication of this wetland to the cause of conservation is the best use of this land for the maximum benefit to man.

Land acquisition was initiated in 1957, immediately following establishment of the Iroquois Refuge by the Migratory Bird Conservation Commission. Purchase of 120 separate parcels of land was required. As of early 1964, 8,514 acres representing 79% of the refuge had been purchased or optioned by negotiation.

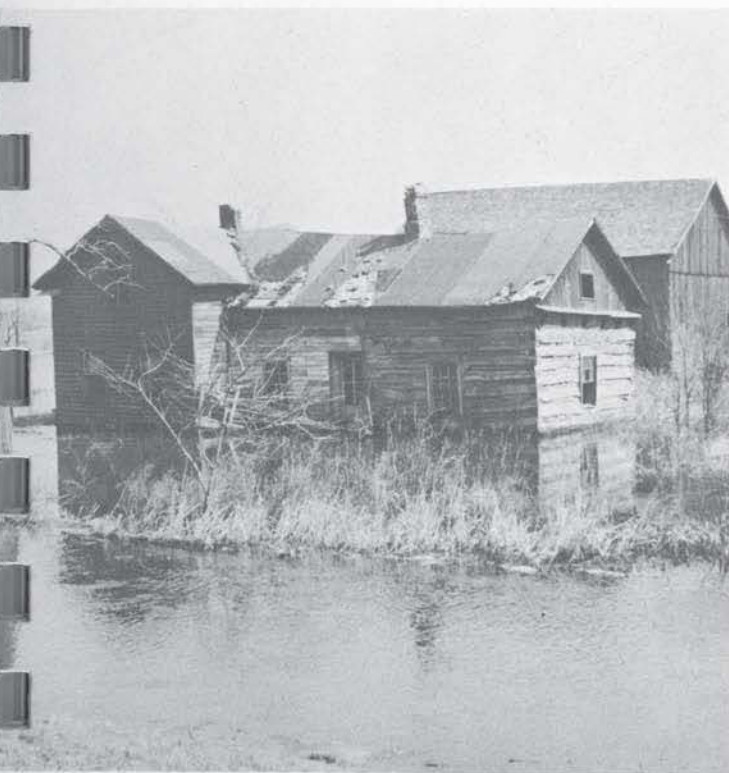
A piecemeal pattern of ownership has thwarted the initiation of development work on any one of the six major impoundment areas. Water developments have necessarily been limited to construc-

tion of a few small upland ponds and pot-holes.

This adverse acquisition picture delays the day Iroquois Refuge can contribute significantly to the welfare of waterfowl as well as to increased public enjoyment of the out-of-doors.

During the initial years of acquisition, limited funds were a problem because Duck Stamp receipts were spread too thinly, nationally. In 1961, Congress passed an accelerated wetlands acquisition bill authorizing a loan of \$105 million to the Bureau of Sport Fisheries and Wildlife for the purchase of prime wetland areas. These funds are to be repaid in full from future sales of Duck Stamps.

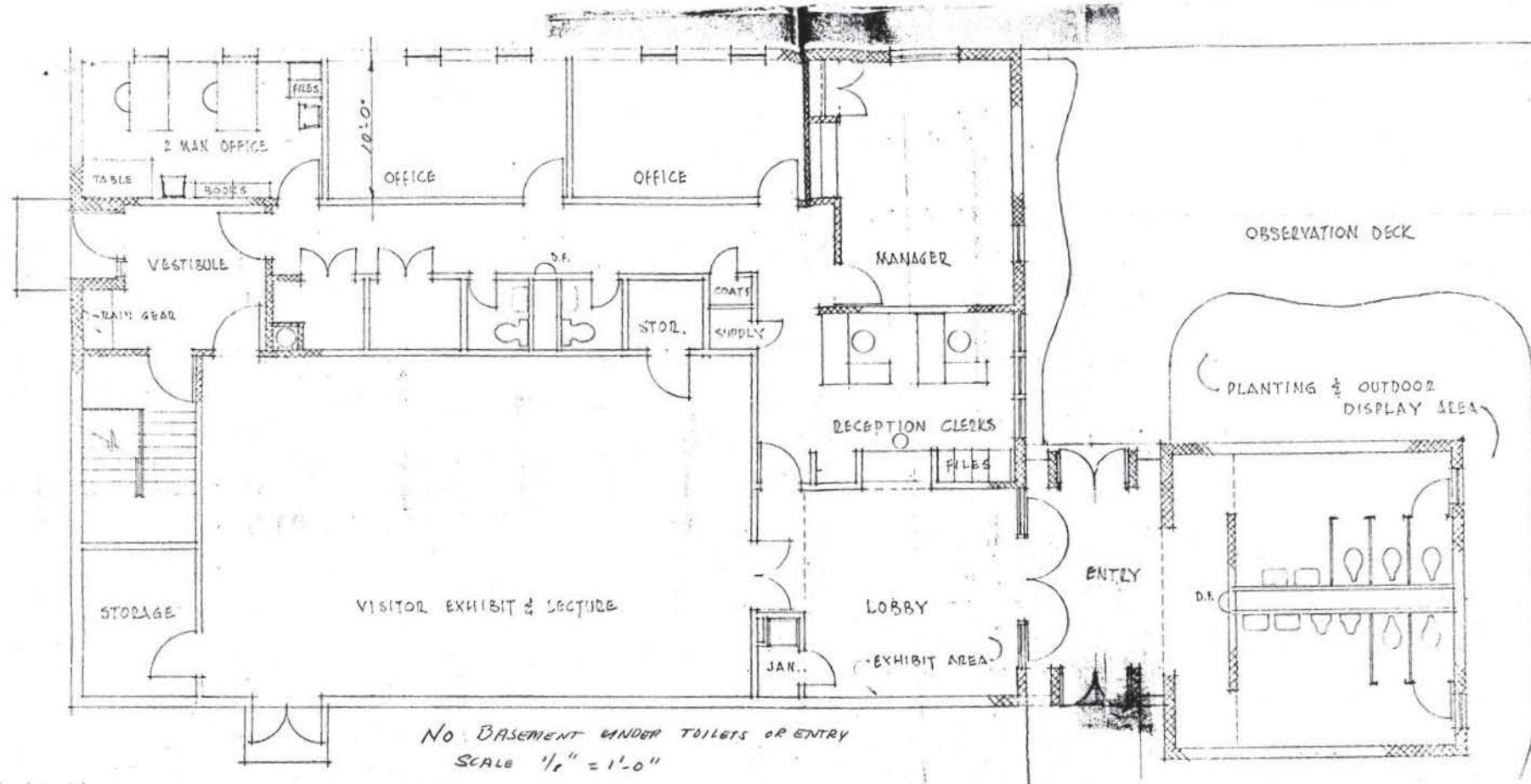
With the assurance of these funds, the rate of acquisition has increased. The potential of the Iroquois Refuge hinges on the acquisition of 2,300 acres.



A Problem for Man



A Paradise for Waterfowl





Economic Benefits



Recreational Benefits

BENEFITS AND COSTS

When developed, the Iroquois Refuge will benefit many people. Refuge visitors will enjoy wildlife and their habitat. Refuge neighbors will harvest refuge products, farm the land, and benefit from the stabilization of ground water. Downstream landowners will be afforded a measure of flood protection. Local economies will benefit from the visitors attracted, as well as from refuge development.

Some of the benefits, like economic uses, are tangible, but most of the bene-

fits cannot be measured precisely in monetary terms. The greatest benefit — the preservation of wildlife for human enjoyment — defies a price tag. Who can say what a flock of geese winging over in a perfect V is worth to a nature lover, or what a duck in the bag may be worth to the waterfowl hunter!

The following table, showing an annual benefit of \$165,000, lists only those benefits for which a value can be reasonably assigned.

The table at the bottom of the page presents a summary of acquisition and development costs.

ANNUAL POTENTIAL BENEFITS

Economic Uses

Haying	\$ 3,000
Grazing	3,000
Fur Harvests	12,000
Timber Sales	2,000
Sharecropping	15,000
	<hr/>
	\$ 35,000

Recreational Uses

Nature Visitors	\$100,000
Hunters	25,000
Fishermen	5,000
	<hr/>
	\$130,000

Total Annual Benefit \$165,000

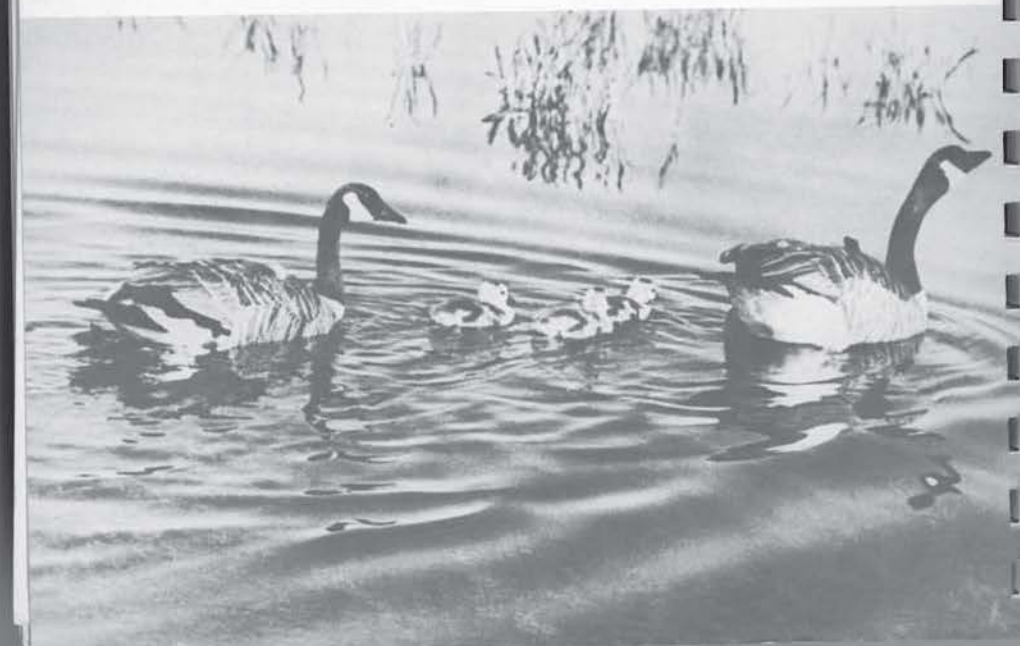
SUMMARY OF ESTIMATED ACQUISITION AND DEVELOPMENT COSTS

Land Acquisition	\$1,135,000
Water Facilities	1,225,500
Biological Facilities	218,600
Buildings	198,600
Fencing and Posting	30,000
Roads and Trails	151,900
Recreation	220,300
	<hr/>

\$3,179,900



Refuges Perpetuate Wildlife for People to Enjoy



CHAPTER 4 OPERATIONS

Following development, the successful attainment of objectives on a refuge involves annual performance of a wide range of operational activities, such as

maintenance, management, protection, handling of recreational use, conservation education, and soil and moisture work.

MAINTENANCE

Maintenance of physical structures and facilities assumes a work load of high importance. The upkeep of 16 miles of earthen dike, 25 water-control structures, 11 miles of graveled road, 24 miles of fence, boundary and informational signs, recreational facilities, and buildings is an all-essential part of refuge operations.

This maintenance work load requires the presence of a full-time maintenance crew, as well as the seasonal employment of certain craftsmen. Maintenance of facilities of this type requires heavy equipment, such as bulldozers, draglines, road graders, and carryall scrapers.



11 Miles of Gravel Road



25 Water-Control Structures to Operate and Maintain

MONTEZUMA REFUGE

Terry Choute



Oliver - Webb
Marsh and Water

MANAGEMENT

Achievement of wildlife objectives demands coordinated management of refuge water and marsh, cropland, grassland, and timberland. Successful management of these basic resources requires application of principles and techniques covering many fields of knowledge. This phase of operations is the most time-consuming.

Marsh and water areas, totaling 5,370 acres of major pools and 130 acres of upland ponds and marshes, will be managed primarily for waterfowl production and growth of food plants. This will be accomplished through manipulation of water levels, erection of artificial waterfowl nesting structures, introduction of beneficial plant species, and mechanical and herbicidal treatment of undesirable vegetation.



Grassland

Haying and grazing will keep the 2,430 acres of grassland in proper condition for nesting waterfowl or browsing geese. Some mechanical and herbicidal control of undesirable plants will be necessary. Soil and moisture practices will be employed.

Sales of harvestable timber products will improve timbered areas for wildlife. Evergreens and food-producing shrubs will be planted. Brushy areas will be maintained by mechanical and herbicidal control.

Refuge neighbors, on a sharecrop basis, and refuge personnel will farm 550 acres to provide grains and green browse for wildlife. This cropland will require soil and moisture practices of fertilizing and liming to be brought to full potential.



Timber and Brushland



Cropland

PROTECTION

Preservation of wildlife and wildlife habitat is a primary charge of refuge personnel. Through the use of signs, and by patrol, the regulations affecting refuge wildlife, lands, resources, and facilities are enforced. The enforcement aspects of public hunting, fishing, and recreational uses demand time of the refuge staff. Refuge personnel are assisted by U. S. Game Management Agents, and by State game and civil enforcement agencies.

Wildfires will not be a major concern when the refuge is developed. For brief periods in the spring and fall, grass fires pose a threat. For adequate protection, fire suppression equipment is maintained. Headquarters development will include a fire alarm system, fire extinguishers, and a high-capacity water pump for emergency fire needs. Refuge buildings are located within areas serviced by the Alabama and Shelby volunteer fire companies.

SOIL AND MOISTURE

Iroquois Refuge is located within, and has cooperative agreements with, the Genesee County and Orleans County Soil Conservation Districts. An inventory of soils, and land use capability maps have been made by Soil Conservation Service personnel. Areas have been selected for rotational cropping, grassland, and upland game habitat, based on land use capability.

Past use has depleted soils. Wind erosion has been a problem on lighter soils. Soil and moisture funds will be utilized for initial brush control; for rough plowing of areas to be managed as cropland and grassland; for lime and fertilizer to bring soils initially to a satisfactory capability level, and for establishing long-term seedings on grassland areas.

After initial treatments, proven conservation measures will be used to maintain soil productivity.



Management of Public Hunting



John H. Hurlbert

Classification of Soils



Fur Harvests *Fort Palmer*



Wildlife Censusing



Alpen

Bird Banding

Wolfe

RECREATION

Public use of the Iroquois Refuge has exceeded 30,000 annual visitor-use days in the undeveloped state. Located within 40 miles of three of the largest cities of the State, and within an hour's drive of 2,000,000 people, visitor-use may well exceed 100,000 annual use days following development. The accommodation of this number of people in wildlife-oriented recreational activities demands a high standard of refuge maintenance.

Directional markers and information signs at overlooks and the visitor center will be used to guide visitors with a minimum of personal attention. Conducted refuge tours, maintenance of nature trails, and administration of public hunting and fishing activities will, however, require the attention of permanent refuge staff personnel as well as seasonal employees.

Lo. Ellis



Bird Watching



Wildlife Photography



Hunting

CONSERVATION EDUCATION

By nature, all National Wildlife Refuges serve as outdoor laboratories and living museums. School classes, youth and adult groups, and the casual visitor are provided the opportunity to see conservation in action. Refuge management problems lend themselves to study and possible solution by college graduate students.

A prime function of the visitor center and nature trails will be to put across the conservation message — the preservation and wise use of our wildlife, soil, water, and other natural resources. Refuge personnel frequently speak and present illustrated lectures before many youth, civic, conservation, and other groups.

By all of these means, the Iroquois Refuge seeks to present to the public a knowledge and appreciation of wildlife and the wetland environment being developed and preserved.



Adult Groups and Visitors

Jerry Wilson



Chapman

School Children and Youth Groups

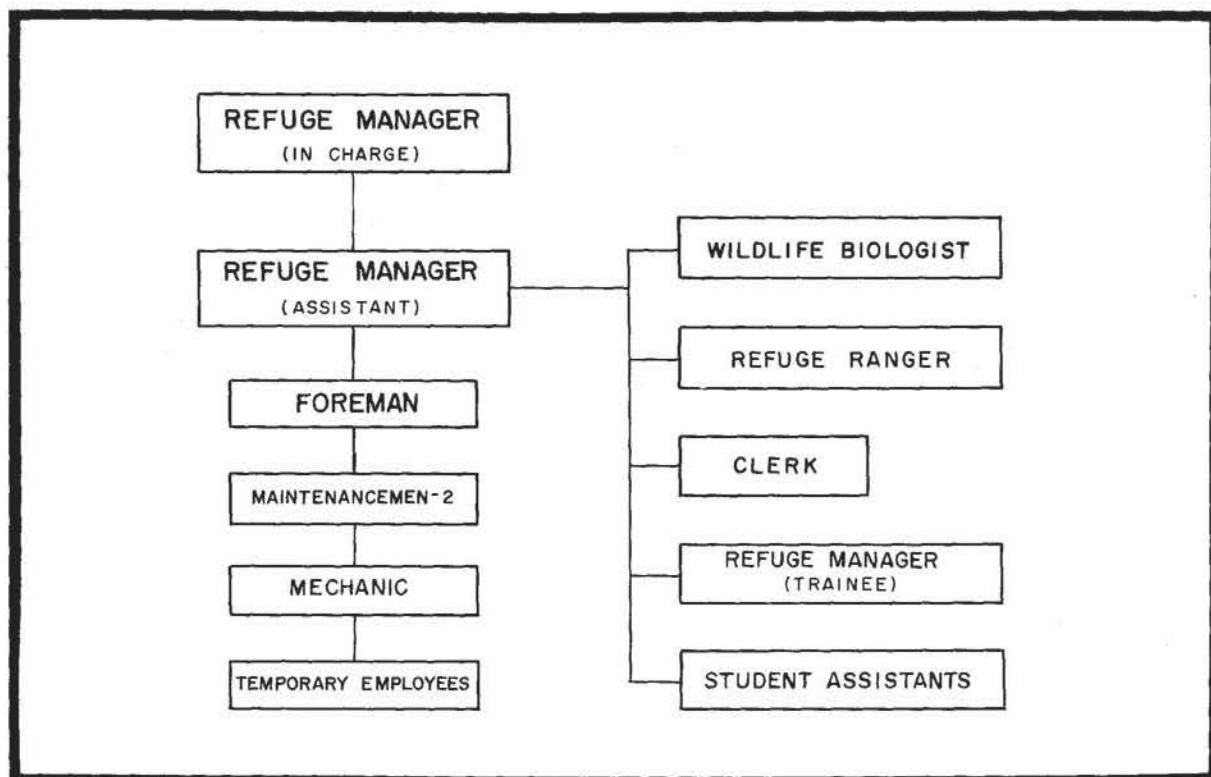
REFUGE STAFF

The magnitude and complexity of the operational activities outlined in the preceding pages necessitate the assignment of personnel with knowledge and skills in several fields. The refuge staff required following development is set forth below.

Skilled and unskilled seasonal employees will assist in the maintenance of

physical facilities and in management programs carried out on refuge lands and waters. Seasonal positions involving investigative work and staffing of the visitor center will provide training assignments for students majoring in the wildlife field.

Operation and maintenance costs during the first five years after development is initiated are outlined below.

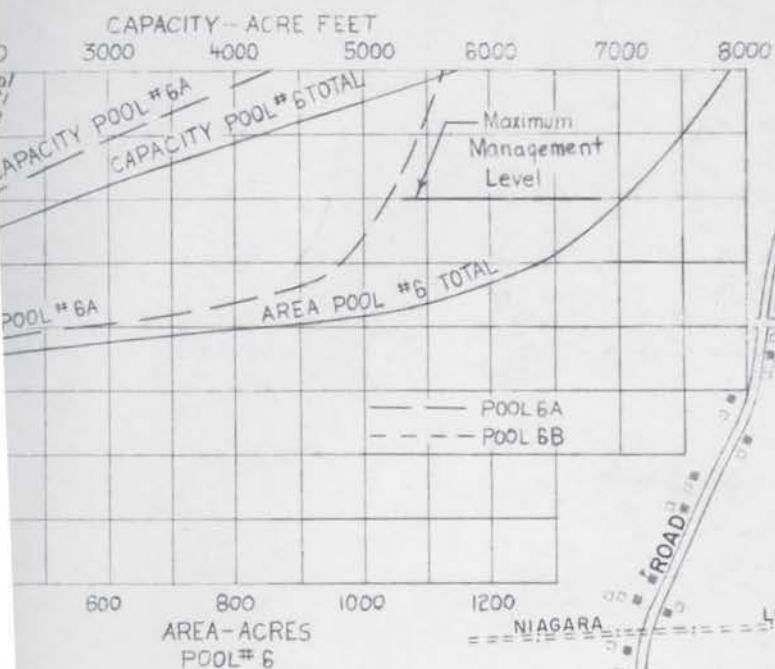


ESTIMATED ANNUAL OPERATION AND MAINTENANCE COSTS ON PROGRESSIVE BASIS

Maintenance	\$16,000	\$18,000	\$20,000	\$22,000	\$25,000
Management	24,000	28,000	32,000	35,000	35,000
Protection	2,000	3,000	5,000	5,000	5,000
Recreation	1,000	2,000	3,000	5,000	5,000
Populations Management . . .	7,000	7,000	8,000	8,000	8,000
Conservation Education . . .	1,000	2,000	2,000	6,000	8,000
	<u>\$51,000</u>	<u>\$60,000</u>	<u>\$70,000</u>	<u>\$81,000</u>	<u>\$86,000</u>
Soil and Moisture Conservation	\$ 5,000	\$ 5,000	\$ 7,000	\$ 7,000	\$ 7,000



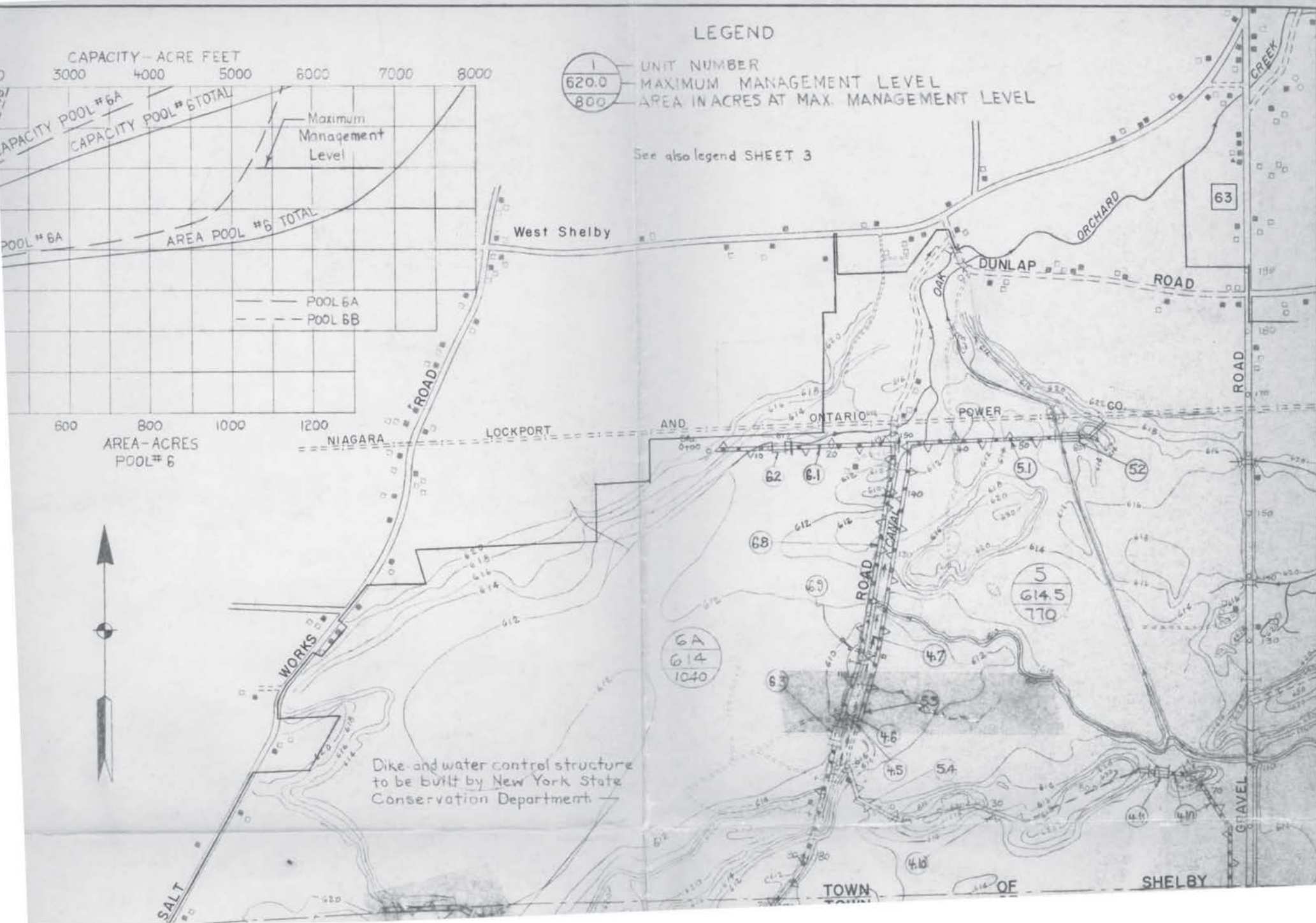
MASTER PLAN OF
DEVELOPMENT
WEST OF RT. 63

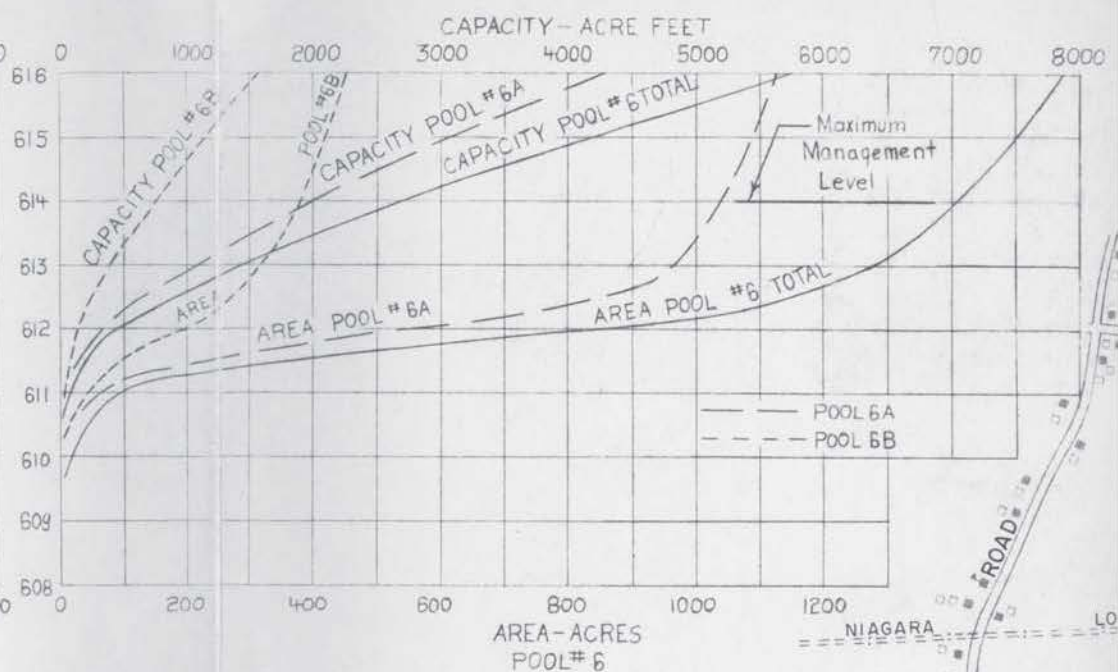
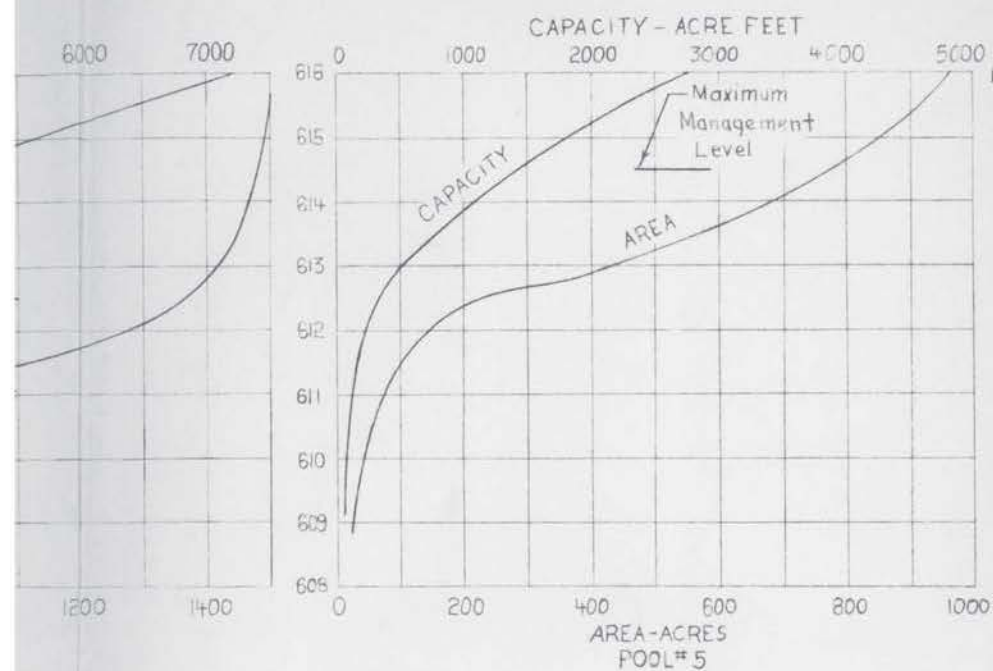


LEGEND

- UNIT NUMBER
- MAXIMUM MANAGEMENT LEVEL
- AREA IN ACRES AT MAX. MANAGEMENT LEVEL

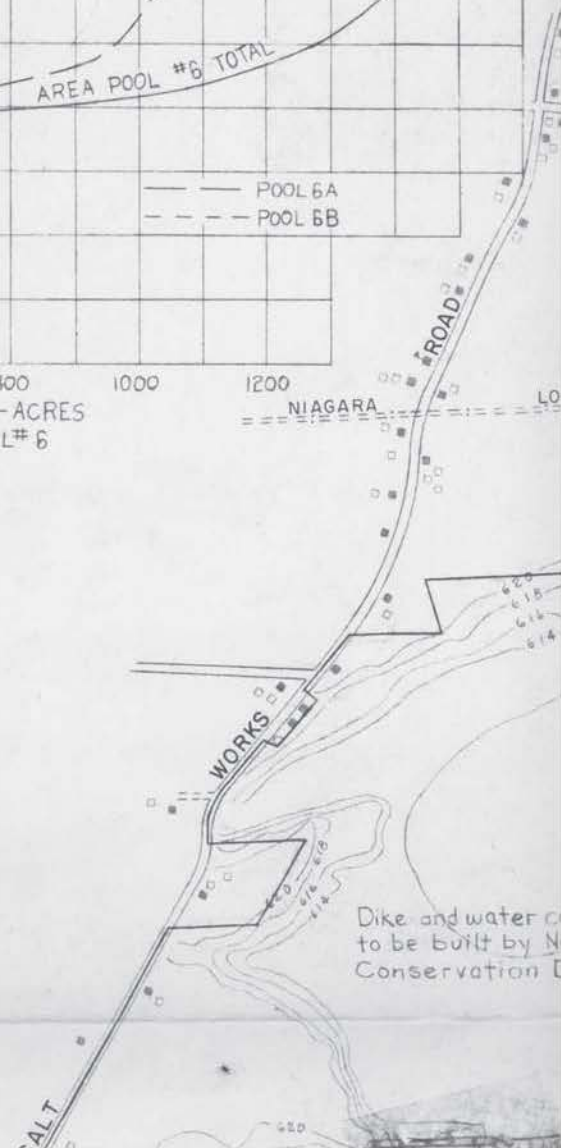
See also legend SHEET 3

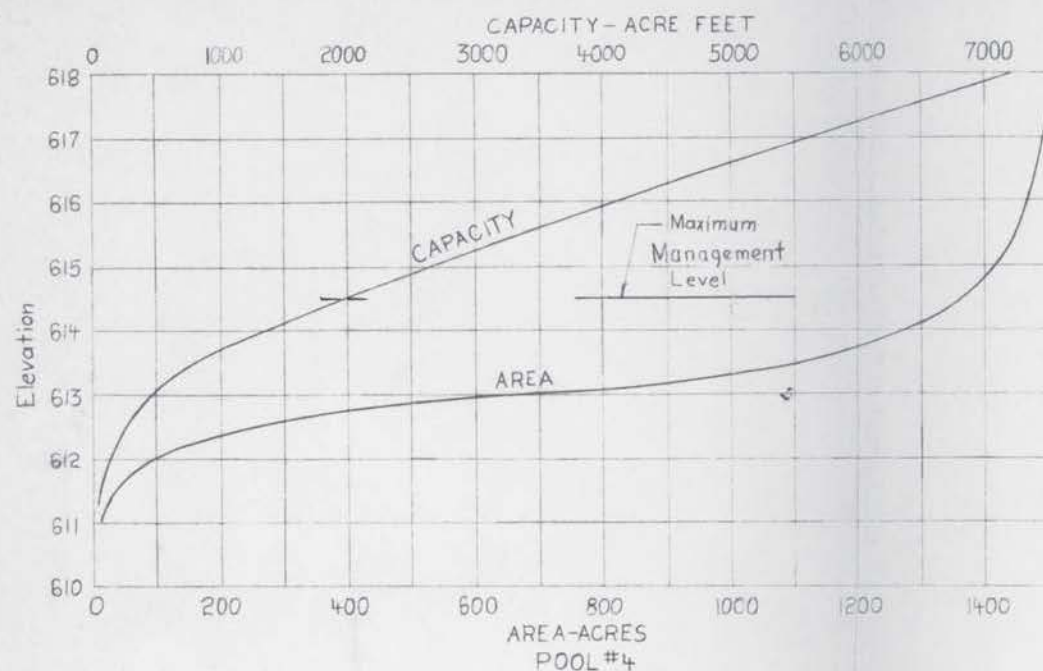




E	CONTROL	OPERATING CAPACITY C.F.S.	ELEVATION FLOW DIKE OR LINE CREST	REMARKS
4'-5.1	—	—	—	617.5 TYPE B DIKE
4'-3.1	—	—	—	617.5 TYPE C DIKE
IP SLAB	2-5' STOP LOG BAYS	80	612	614.5 WS. FROM UNIT 3, TYPE 3 STRUCTURE
H 100	2-5' STOP LOG BAYS	80	610	614.5 TYPE 1 STRUCTURE
TOP SLAB	2-5' STOP LOG BAYS	80	607	614.5 TYPE 3 STRUCTURE
4'-5.1	—	—	—	617.5 TYPE B - ON EACH SIDE OF 4.5
U-2	—	80	607	603.4 PART OLD FEEDER CANAL (60'-0000)
4'-5.1	—	—	—	617.5 TYPE C STRUCTURE
P 21.3	2-5' STOP LOG BAYS	80	613	615.0 TYPE 3 STRUCTURE
4'-5.1	—	—	—	617.5 TYPE A DIKE
IP	2-5' STOP LOG BAYS	80	609	608.5 SIMILAR TO TYPE 3 STRUCTURE

ON NIAGARA CO.





UNIT #4

NO.	DESCRIPTION	MATERIALS	SIZE	CONTROL	OPERATING CAPACITY C.F.S.	ELEVATION		REMARKS
						FLOW LINE	DIKE or CREST	
4.1	DIKE WITH 10' GRAVEL ROAD	EARTH GRAVEL	3:1 - 14' - 5:1	—	—	—	617.5	TYPE B DIKE
4.2	DO	DO	3:1 - 14' - 3:1	—	—	—	617.5	TYPE C DIKE
4.3	WATER SUPPLY STRUCTURE	CONCRETE	13'X14' TOP SLAB	2-5' STOP LOG BAYS	80	612	614.5	W.S. FROM UNIT 3, TYPE 3 STRUCTURE
4.4	EQUALIZER	CONC. GRVL. RIP-RAP	LENGTH 100'	2-5' STOP LOG BAYS	80	610	614.5	TYPE 1 STRUCTURE
4.5	CONTROL STRUCTURE & DRAIN	CONCRETE	13'X14' TOP SLAB	2-5' STOP LOG BAYS	80	607	614.5	TYPE 3 STRUCTURE
4.6	DIKE WITH 10' GRAVEL ROAD	EARTH GRAVEL	3:1 - 14' - 5:1	—	—	—	617.5	TYPE B - ON EACH SIDE OF 4.5
4.7	UNIT 4 DRAIN	EARTH	2:1 - 20' - 2:1	—	80	607	603.4	PART OLD FEEDER CANAL (0 - 600)
4.8	DIKE WITH 10' GRAVEL ROAD	EARTH GRAVEL	3:1 - 14' - 5:1	—	—	—	617.5	TYPE C STRUCTURE
4.9	UNIT 4 WATER SUPPLY STRUC.	CONCRETE	13'X14' TOP SLAB	2-5' STOP LOG BAYS	80	613	619.0	TYPE 3 STRUCTURE
4.10	DIKE WITH 10' GRAVEL ROAD	EARTH GRAVEL	5:1 - 14' - 5:1	—	—	—	611.5	TYPE A DIKE
4.11	WATER SUPPLY STRUCTURE	—	48" CMP	2-5' STOP LOG BAYS	50	609	614.5	SIMILAR TO TYPE 2 STRUCTURE

4.2	DO	DO	3:1 - 14' - 3:1	—	—	—	617.5	TYPE C DIKE
4.3	WATER SUPPLY STRUCTURE	CONCRETE	13'X14' TOP SLAB	2-5' STOP LOG BAYS	80	612	614.5	WS. FROM UNIT 3, TYPE 3 STRUCTURE
4.4	EQUALIZER	CONC. GRVL, RIP-RAP	LENGTH 100'	2-5' STOP LOG BAYS	80	610	614.5	TYPE 1 STRUCTURE
4.5	CONTROL STRUCTURE & DRAIN	CONCRETE	13'X14' TOP SLAB	2-5' STOP LOG BAYS	80	607	614.5	TYPE 3 STRUCTURE
4.6	DIKE WITH 10' GRAVEL ROAD	EARTH GRAVEL	3:1 - 14' - 5:1	—	—	—	617.5	TYPE B - ON EACH SIDE OF 4.5
4.7	UNIT 4 DRAIN	EARTH	2:1 - 20' - 2:1	—	80	607	605.4	PART OLD FEEDER CANAL (S-40003)
4.8	DIKE WITH 10' GRAVEL ROAD	EARTH GRAVEL	3:1 - 14' - 5:1	—	—	—	617.5	TYPE C STRUCTURE
4.9	UNIT 4 WATER SUPPLY STRUCT.	CONCRETE	13'X14' TOP SLAB	2-5' STOP LOG BAYS	80	613	619.0	TYPE 3 STRUCTURE
4.10	DIKE WITH 10' GRAVEL ROAD	EARTH GRAVEL	5:1 - 14' - 5:1	—	—	—	617.5	TYPE A DIKE
4.11	WATER SUPPLY STRUCTURE	—	48" CMP	2-5' STOP LOG BAYS	80	603	614.5	SIMILAR TO TYPE 2 STRUCTURE

UNIT #5

5.1	DIKE WITH 10' GRAVEL ROAD	EARTH GRAVEL	3:1 - 14' - 5:1	—	—	—	617.5	TYPE B DIKE
5.2	CONTROL STRUCTURE & DRAIN	CONC. GRVL, RIP-RAP	LENGTH 200'	4-5' STOP LOG BAYS	160	606	614.5	SIMILAR TO TYPE 1 STRUCTURE
5.3	EAST DIKE UNIT 4 DRAIN	EARTH GRAVEL	3:1 - 14' - 5:1	—	—	—	617.5	TYPE B DIKE
5.4	DIKE WITH 10' GRAVEL ROAD	DO	5:1 - 14' - 5:1	—	—	—	617.5	TYPE A DIKE

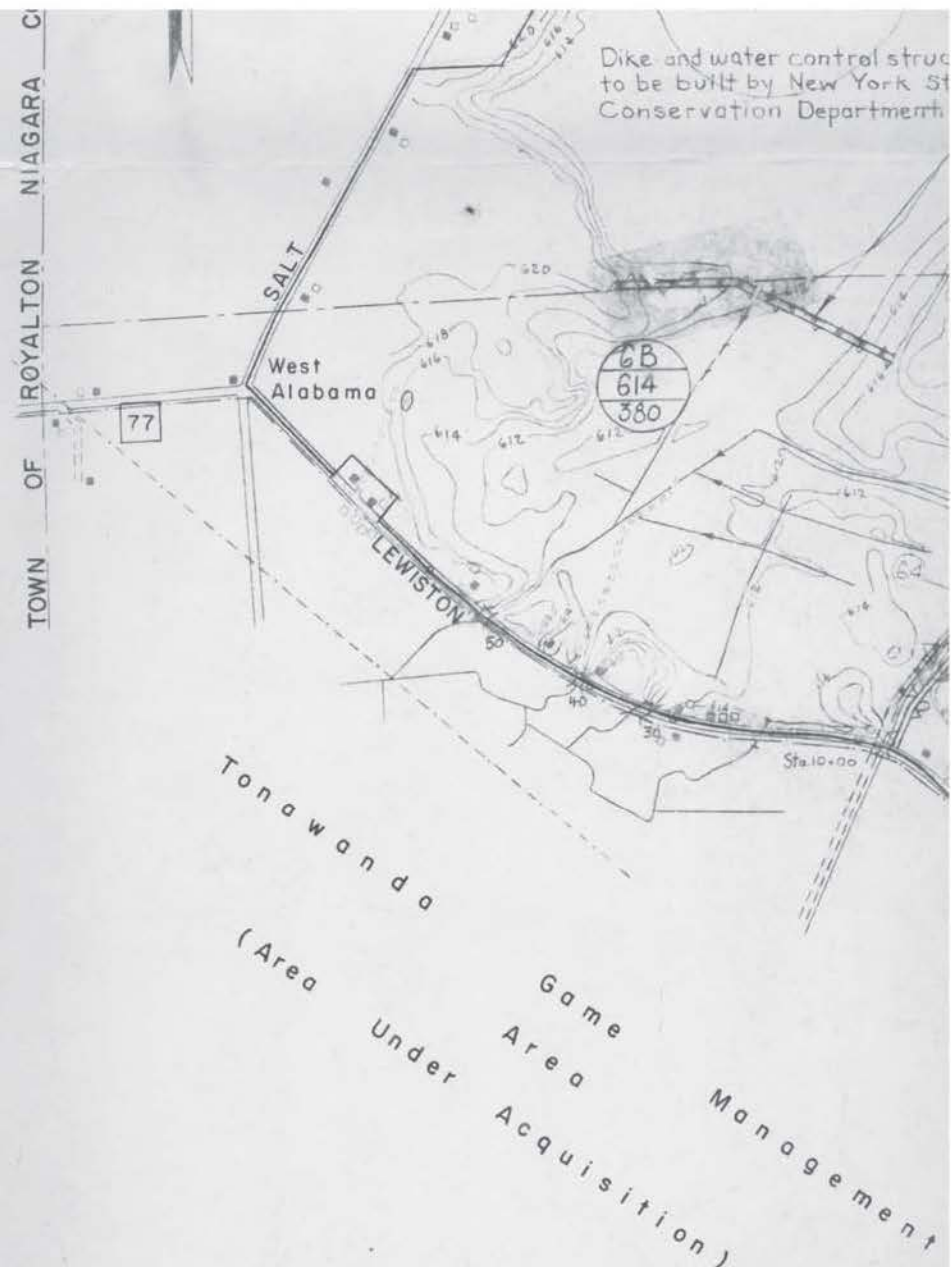
UNIT #6 (#6A & #6B)

6.1	DIKE WITH 10' GRAVEL ROAD	EARTH GRAVEL	3:1 - 4' - 3:1	—	—	—	617.0	TYPE B DIKE
6.2	CONTROL STRUCTURE & DRAIN	CONC. GRVL, RIP-RAP	LENGTH 100'	2-5' STOP LOG BAYS	80	608	614.0	TYPE 1 STRUCTURE
6.3	WATER SUPPLY STRUCTURE	DO	LENGTH 100'	2-5' STOP LOG BAYS	80	608	614.5	SUPPLY FOR POOLS #6 OR #6A (TYPE 1 STRUCTURE)
6.4	DO	DO	LENGTH 100'	2-5' STOP LOG BAYS	80	608	614.5	SUPPLY FOR POOLS #6 OR #6B
6.5	FEEDER RD. DIKE	EARTH GRAVEL	5:1 - 14' - 5:1	—	—	—	617.5	ON FEEDER ROAD, 10' GR. SUR., SOUTH OF STA. 80+00
6.6								OMIT
6.7	FEEDER CANAL DIKE	EARTH GRAVEL	3:1 - 14' - 5:1	—	—	—	617.5	
6.8	FEEDER RD. DIKE	EARTH GRAVEL	3:1 - 14' - 5:1	—	—	—	617.0	ON FEEDER RD, 10' GR. SUR. NORTH OF STA. 90+00
6.9	INVERTED SYPHON - UNIT 5 to UNIT 6	CONC., CONC. PIPE	LENGTH 135'	2-5' STOP LOG BAYS	5	—	—	

STOP LOG BAYS	80	612	614.5	W.S. FROM UNIT 3, TYPE 3 STRUCTURE
STOP LOG BAYS	80	610	614.5	TYPE 1 STRUCTURE
STOP LOG BAYS	80	607	614.5	TYPE 3 STRUCTURE
—	—	—	617.5	TYPE B- ON EACH SIDE OF 4.5
—	80	607	605.4	PART OLD FEEDER CANAL (S-10000)
—	—	—	617.5	TYPE C STRUCTURE
STOP LOG BAYS	80	613	615.0	TYPE 3 STRUCTURE
—	—	—	617.5	TYPE A DIKE
STOP LOG BAYS	80	609	614.5	SIMILAR TO TYPE 2 STRUCTURE

—	—	—	617.5	TYPE B DIKE
STOP LOG BAYS	160	606	614.5	SIMILAR TO TYPE 1 STRUCTURE
—	—	—	617.5	TYPE B DIKE
—	—	—	617.5	TYPE A DIKE

—	—	—	617.0	TYPE B DIKE
STOP LOG BAYS	80	608	614.0	TYPE 1 STRUCTURE
STOP LOG BAYS	80	608	614.5	SUPPLY FOR POOLS #6 OR #6A (TYPE 1 STRUCTURE)
STOP LOG BAYS	80	608	614.5	SUPPLY FOR POOLS #6 OR #6B
—	—	—	617.5	ON FEEDER ROAD, 10' GR. SUR., SOUTH OF STA. 80+00
—	—	—	617.5	—
—	—	—	617.0	ON FEEDER RD, 10' GR. SUR. NORTH OF STA. 90+00
STOP LOG BAYS	5	—	—	—



Dike and water control structure
to be built by New York State
Conservation Department.

SALT

West
Alabama

77

LEWISTON

6B
614
380

FEEDER

TOWN
TOWN

OF
OF

SHELBY
ALABAMA

63

SOUTH

Tonawanda

(Area Under Acquisition)
Game Area Management

Sta. 10+00

ROAD

77

CASEY

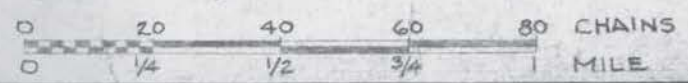
HEADQUARTERS
SITE

ROAD

Sta. 10+00

63

PLAN OF PROPOSED DEVELOPMENT
WEST OF
SOUTH GRAVEL ROAD



5R-NY-505-1

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