THE CARMANS RIVER STORY

A NATURAL AND HUMAN HISTORY

BY

PAMELA BORG
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by Pamela Borg and
Elizabeth Shreeve

Foreword by Dennis Puleston

Illustrations by Elizabeth Shreeve,
Pamela Borg, Gail Miller, Dennis Puleston,
Laura Quatrochi, and Thomas Van't Hof

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Art

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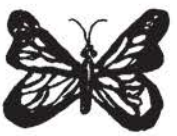

Dennis

With thanks for their concern,
inspiration, and humor,
and for the many good times we've shared.

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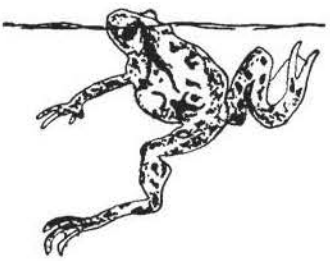

Foreword

As so much of Long Island is being engulfed in the tide of 'Progress,' many of us have become involved in efforts to save some of its priceless natural assets. One such area is the Carmans River basin, still largely unspoiled and of ever-increasing value as a refuge for many forms of wildlife. The river also helps sustain the South Shore's marine industry by providing shelter, nutrients, and spawning grounds for important seafood resources.

To obtain protection for the river, a group of students at Bellport High School, together with several college students and local citizens, have worked with State legislators to obtain its inclusion in the State's Wild, Scenic, and Recreational Rivers System. This has involved the preparation of a study report describing the ecological values of the river, and recommending those areas along its banks that should be acquired. The report was submitted to the Department of Environmental Conservation in February, 1974. In the meantime, deep concern for the river had inspired two high school seniors to undertake an independent project. This was the publication of a booklet, intended for public officials and interested citizens, detailing the historical, economic, and natural values of the Carmans River area.

Perhaps these two girls, Pamela Borg and Elizabeth Shreeve, were not at first fully aware of the magnitude of their task. But their enthusiasm and dedication have never wavered. I have had the privilege of coming to know these girls very well, as they have accompanied me and their biology teacher Arthur Cooley, with other students, on many biologically oriented field trips, both locally and to Canada, Florida, and New England. This has enabled me to see them perform well under a variety of conditions, but it was still a surprise to find how well they have recently developed into extremely competent authors and editors. They are also responsible for most of the drawings in the booklet. This publication has required many contacts with local historians, naturalists, fishermen, and fellow students, all of whom have been persuaded by our two authors to contribute their expertise.

The booklet, therefore, will serve not only to impress the reader with the aesthetic and ecological values of the Carmans River area, but also with the dedication and talents of the two students who have produced such an eloquent argument for the preservation of this priceless natural asset.

Dennis Puleston, Trustee
Environmental Defense Fund

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Introduction

The Carmans River is a unique natural resource for Brookhaven Town residents. In this study, undertaken as an independent project at Bellport High School, we have attempted to provide a historical description of the river area to show the river's effect on the lives of the local people since the days of the Indians, and a biological description of the river basin as an ecologically unspoiled area. Also included are plant and animal species lists compiled in species surveys by the advanced biology classes of Bellport High School in 1970 and 1974. These species lists should be regarded as a starting point for further biological investigation.

This is the first descriptive publication about the river that we know of, and we hope that it will add to the appreciation of this fine natural resource. It is vitally important that people understand the dangers that careless use of the river will cause. Littering, overdevelopment, wildlife disturbance, and pollution could easily ruin this presently unspoiled area. If used responsibly, however, the Carmans River can continue to provide recreation and enjoyment for the people of Brookhaven Town for many years to come.

P.B. and E.S.
April, 1974
Bellport, New York

History of the Carmans River

The Carmans River has seriously affected the lives of many groups of people. The river's resources have provided for many of the needs and pastimes of the Indians as well as the white settlers of the area.

Indians

The white men who settled the Carmans River area learned their whaling and fishing skills from the Unkechaug Indians, a peace-loving tribe who depended largely on the produce of the river and bay for their food.

The Unkechaugs were one of thirteen tribes making up the Long Island confederacy of the Delaware Indians; they had lived on Long Island since their Delaware-Algonquin race migrated eastward, centuries before. At the time of the first white settlement in 1635, the Delawares had a population of 6500 and were at the height of their civilization.

The Unkechaugs' land extended from Eastport to Bayport and included the bay and barrier beach on Fire Island. For many years they had their meeting place on the east side of the Carmans River in southern Brookhaven. This outlet to the bay and ocean provided them with the opportunity for whaling and fishing. For these occupations the Indians depended on dugout canoes. A canoe was made by charring and burning a single tree trunk and then scraping it with heavy seashells to taper the ends and to form a cockpit. These crude boats were paddled from a crouching position, and some were made to hold as many as eighty men. In these boats the Delawares journeyed as far as Boston.

The Unkechaugs made other uses of their proximity to the bay and ocean. They ate clams and oysters, and speared fish by torchlight in a process called "wigwass." They made such fine wampum, a form of currency consisting of beads made from shells, that Long Island became known as Seawanhacky, or "Land of Shells." After their clambakes and wampum-making the Indians left great piles of empty shells on the beach. Wampum at this time served as

currency for all Indians east of the Mississippi River, and the wampum from the shores of the Great South Bay was famous. Black wampum, or suckanhock, was replaced by the quahog (common clam). Black wampum had twice the value of white wampum or meteauhock which was made from periwinkle shells. White settlers recognized this medium of exchange, and with their steel tools made so much wampum that it eventually became worthless as currency.

The decline of the Long Island Indians was a rapid process. They did not understand the white man's idea of ownership, and from 1635 to 1685 sold most of their land for mere trinkets, not imagining that this could affect their inherent right to hunt and fish on the property. In 1664, Tobaccus, sachem or chief of the Unkechaug Tribe, sold what is now Bellport and Brookhaven to a group of white men from Setauket for four coats and $15.25 in cash. In 1705, a deed was obtained from the Indians which guaranteed the white settlers of Bellport full hunting and fishing rights.

As the position of white men and Indians changed, the Indians began to find it more and more difficult to live off the land and as a result went to work for the white settlers. They often married with black slaves and thereby sacrificed their legal freedom. In 1689, the Brookhaven townspeople demanded that the Unkechaugs be disarmed, despite the fact that relations between the settlers and the Indians had been peaceful.

Gradually, the tribes began to give up their customs and identity, and only the beach Indians of the Unkechaugs, the Poosepatucks, and the Montauk Tribe continued to live in communities which in time became reservations. These tribes also adopted the white man's standards, as was evident when Thomas Jefferson visited the Poosepatucks in 1791; the Unkechaug dialect had been forgotten by everyone except three old women. By the late 1700's the Indian's way of life, which had been so close to nature, was absorbed by the culture of the white man.

Settlement

The first white families to settle Suffolk County crossed the Long Island Sound from English colonies in Massachusetts and Connecticut. At this time the Dutch were well established in Queens and Nassau Counties, and the settlement by the English of Brookhaven Town in 1655 may have been part of an effort to prevent the Dutch from spreading further east.

Conflicts between the Dutch and the English were common on Long Island. Captain Will Corwin of Bellport used to say of the people of the Great South Bay, "A bayman is nothing but the last of the true New England Yankees," while old-timers of Dutch ancestry will insist that the baymen are the "best of the Dutch."

Brookhaven Town, originally called "Ashford," was purchased in 1655 from the Indians for "10 coats, 12 hoes, 12 hatchets, 50 muxes (small awls used for making wampum), 100 needles, 6 kettles, 10 fathoms (60 feet) of wampum, 7 pepx (pipe-fulls) of powder, 1 pair of children's sockings, 10 pounds of lead, and 12 knives." The agreement also stipulated that settlers and Indians would live peacefully together.

The early settlers soon discovered extensive areas of salt hay on the south side of the town which could be harvested for their cattle. In 1657 two large meadows, one bordering the Carmans River and the other the Great South Bay, were purchased from the chief of the Delaware Indians. Because the sale had been made with the Delawares, however, the Unkechaug Indians of southern Brookhaven also insisted on being paid for the land, and in 1674 all mowable land "that lieth between a river called Connecticut (Carmans) to another river called Mastic" was purchased from Tobaccus, chief of the Unkechaugs.

Tobaccus also had sold what is now Brookhaven and Bellport to settlers in 1664. This land was divided into forty lots, each selling for less than 35 cents. Richard Woodhull bought all the land along the Carmans River, including Long's or Woodhull's Point which is now a wildlife preserve at the western mouth of the river. As was the custom whenever land was sold, the Indians gave the new owners a sod of earth and a twig from a tree.

Residents of Brookhaven were drawn to the southern part of

the town for reasons other than salt haying. The whaling industry began in this area as early as 1667, when the white men agreed to pay the Unkechaug Indians five pounds in wampum for every whale they delivered. The Carmans River was especially important during this time as a landing place for whaling crews stationed at winter whaling camps across the bay. Fires were lighted at Long's Point and at Fire Place Neck to guide boats coming through the inlet from the ocean, and landings were built along the river including Indian Landing, Squassux Landing, and Zach's Landing. Sloops came up the river to "The Willows" near Bartow's Creek to fill with freshwater. At Indian Landing, formerly a meeting place for Indians, a dock and a drawbridge existed until World War I.

Fishing and shell-fishing were also found to be exceptionally fine in southern Brookhaven, and many people came from Setauket in the northern part of the town to live along the bay and river and to gain their living from clamming, oystering, eeling, and fishing.

Another promising business at this time was the production of tar and turpentine available from pine trees along Beaver

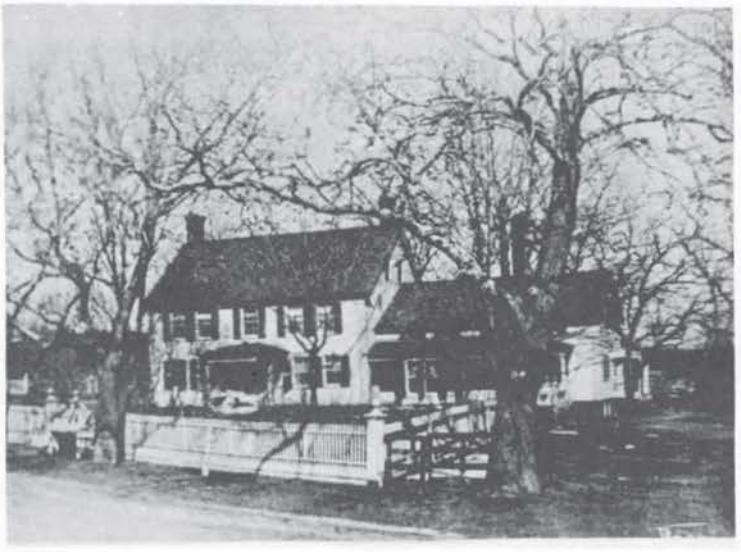
The Carman Mills

Dam Creek. By 1705 the "tar men" had become so busy that the town ordered a tax on all tar and turpentine produced.

These businesses resulted in a hamlet of fisherman and "tar men" located on the neck of land west of the Carmans River referred to as "ye fierplace at ye south." This settlement, originally called Fireplace, became so important that in 1757 the community was established as "South Haven," an abbreviation of "South Brookhaven." The Presbyterian Church at South Haven was built in 1740, just west of the "goin over" on the Carmans River.

Vital to the growth of the South Haven settlement were the mills located on the Carmans River. These mills became even more important when Samuel Carman, after whom the river is named, married into the business. With a good head for business, Carman and his family built a large house in front of the mills which provided space for a post office, a store, and a tavern in which hunters from all over New York could stay while they hunted duck and deer. As boats could come up the river to within a quarter mile of the store, and the weekly stagecoach from Brooklyn to Sag Harbor stopped regularly, the location of the establishment was ideal. Carman's store provided everything from thimbles to velvet breeches - although rum was the most lucrative item. It also established, along with the South Haven Church, an important meeting place for early settlers. Roads from all directions converged here, providing a good location for political meetings and elections.

One of the many important people to stay at Carmans Tavern while hunting and fishing was Daniel Webster. Webster, visiting Brookhaven in 1827, had tried unsuccessfully for some time to catch a huge trout in the river. One Sunday morning while he and his host Samuel Carman were in church across the road, one of Carman's slaves entered the church to whisper to Webster that the fish had been sighted in the pond below the mill. Webster tiptoed out, followed by Carman. The minister rapidly concluded his sermon and left with his congregation to watch Webster hook a fourteen and one half pound trout. An outline of the fish was traced against the wall of Carman's Tavern, and a local blacksmith made a



The Carman Homestead and Tavern

carving of the fish one-third larger than its actual size. Until it was struck by lightning fifty years later, the carving served as a weather vane on the steeple of the South Haven Church.

Sometime after this catch, Webster sent Carman one hundred dollars and asked for the rental of some land bordering the river above the mill, as well as fishing rights for himself and some friends, who included Martin Van Buren. This was the beginning of the Suffolk Club which in 1868 bought and maintained a 1500-acre shooting and fishing preserve. The preserve, later called the Hard Estate after the last private owner and now maintained by Suffolk County as the South Haven Park, included the Carman Mills. The club members, which at one time included Teddy Roosevelt, built a three-story lodge on the property. Another hunting lodge, the St. George's Club, was built in 1910 along the southern part of the river at Indian Landing.

The eastern bank of the Carmans River also grew in imporance, especially during the time leading up to the Revolution. This neck of land, now called Mastic Point, juts out into the

bay until it almost reaches Fire Island at Smith's Point, and the easy crossing was very convenient for whalers. Colonel William Tangier Smith purchased Mastic Neck from the Unkechaug Indians in 1691. In 1700 he gave the Indians the right to raise crops on a 175-acre piece of property which was to be reserved for them forever for the annual rent of "Two yellow Eares of Indian corne." Here Colonel Smith built his summer home, The Manor of St. George, which is still open to the public. The Manor was taken over during the Revolution by the British who used it as a fort strategically placed between land and sea.

Because of British interventions, many citizens of Brookhaven became active military leaders during the Revolution. Among these was General William Floyd, who owned land along the Carmans River. General Floyd was the only native Long Islander to sign the Declaration of Independence. Soldiers hid from the British in the marshes at Long's Point, and a spy ring, set up in the area of the northern Carmans River, included Abraham Woodhull and a woman named Ann Smith Strong, who used her handkerchiefs and black petticoats hung on the clothesline to relay messages.

When the Long Island Railroad opened up in 1884 and Long Island highways began to improve, city-dwellers visited the Brookhaven area more and more. A ferry was run daily from Brookhaven to the summer resort at Smith's Point on Fire Island, and a boarding house opened on Beaver Dam Road. Pleasure sailing became very popular around 1900, and the shipbuilding industry prospered. One especially successful shipyard was Captain Samuel Newey's at the end of Beaver Dam Road along the Carmans River. Here, when the bay and river were deeper and large vessels were a common sight, Captain Newey built boats for all purposes, including the oil trade, fishing, ferrying, and pleasure.

Duck hunting also became an important industry along the river. The farms opened in the 1920's, and in 1936 part of Carman's homestead was torn down by Charles E. Robinson and the property was used for the Carmans River Duck Farm. The industry prospered greatly during the meat

shortage of World War II, but with governmental restrictions concerning pollution the numbers of farms has decreased.

The many businesses and activities carried along the Carmans River reflect the resourcefulness of the Indians and the settlers, as well as the inherent value of the river. For the Indians who fashioned their duck decoys from river reeds, for the fisherman and whalers who gathered at Carmans Tavern for a drink of rum, for those who sailed the Great South Bay in one of Captain Newey's yachts, the river was long the source of plenty.

Occupations and Industries along the Carmans River

Many of the industries in Brookhaven have depended on the Carmans River as a source of raw materials and water power for their success. The river has also produced an important outlet to the bay and ocean. These businesses included whaling, milling, ice harvesting, salt haying, duck-hunting, and fishing.

Whaling

Whaling has a long history on southern Long Island. The Unkechaug Indians were expert whalers and taught their harpooning and canoeing skills to the white settlers of Brookhaven Town. With this knowledge and their superior equipment, Brookhaven settlers ventured far out to sea in search of oil, blubber, and bone. This produced many opportunities for new businesses.

The Indians developed their crude method of whaling hundreds of years before the white men came. During the winter when the ocean was inhabited by numerous right whales, the Indians lived on the Fire Island beach. At a cry from the lookout posted on a sand dune, they would launch their boats and attempt with their stone-tipped wooden spears to drive the whale into shallow water and onto the beach. In 1605, Waymouth's Journal described the hunt in this fashion:

> One especial thing is their manner of killing the whale, which they call powdawe; and will describe his form; how he bloweth up the water; and that he is twelve fathoms long; and that they go in company of their king with a mul-

> titude of their boats; and
> strike him with a bone, made
> in fashion of a harping iron
> fastened to a rope, which
> great and strong of the bark
> of trees;....then all their
> boats come about him as he
> riseth above the water, with
> their arrows they shoot him
> to death; when they have
> killed him and dragged him
> to shore, they call all their
> chief lords together and sing
> a song of joy; and....divide
> the spoil and give to every
> man a share, which....they
> hang up about their houses
> for provisions; and....they
> boil off the fat and put to
> their pease, maize, and other
> pulse which they eat.

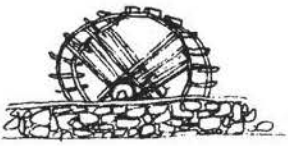
Originally the Indians used dugout canoes to drive the whale onto the ocean shore. The white settlers, while still exploiting the skills of the Indian harpooners, improved on this method of "shore whaling" by introducing iron-tipped harpoons and light, manageable cedar boats. The whaling season took place during the winter and so provided Brookhaven fishermen and farmers with year-round employment. Whaling near the Carmans River is described by Dr. Edward Shaw in Legends of the Fire Island Beach, published in 1895:

> From the days of earliest
> settlement, whaling crews
> used to go on the Beach. They
> would live there during the
> season and watch the sea by
> day, ready to launch their
> boats and push off whenever

> they saw a whale blow. Their supplies were brought from the south side of the Island, and fires were built on Long Point, as a signal for the crew to come off. The Long Point of those days....pushes out into the bay a mile, about, west of the mouth of the Carmans River.

As off-shore whaling became a major occupation in Brookhaven and the whalers left the beach to voyage as far south as Brazil, they began to require larger boats and more equipment. Ships launched from shipyards along the Carmans River journeyed around Cape Horn to the Pacific Ocean and back to Brookhaven Village to unload cargoes of oil worth as much as $350,000 at that time.

Mills



In the 1600's and 1700's, Long Island settlers depended on the Carmans River as a source of water power for several mills located in Yaphank and South Haven. Before the construction of mills along the Carmans River, farmers had to take their grain across the Long Island Sound to be ground in Connecticut, and the trip was dangerous for the small boats. To remedy this the settlers built grist mills to grind their crops of English grain and Indian corn.

In addition to the grain mills, two other types of mills were established along the river, each performing a significant role in the survival of the settlers. The function of the fulling mills was to cleanse, shrink, and thicken cloth by moisture, heat, and pressure, while the saw mills processed logs into boards and timber for homes and town buildings.

For over a hundred years, farmers brought their raw materials to these mills, where the roads and the river came together and provided people with a central meeting place. Slowly, as automation took over, the milling industry faded away until

now nothing remains except for the ponds where the mills once stood.

Ice Harvesting

In the winter, ice from the mill ponds was laboriously cut and sold, providing another industry for Brookhaven residents. In the early 1800's, refrigerating food with ice harvested along the Carmans River replaced salting, spicing, pickling, smoking, and drying as a method to preserve food.

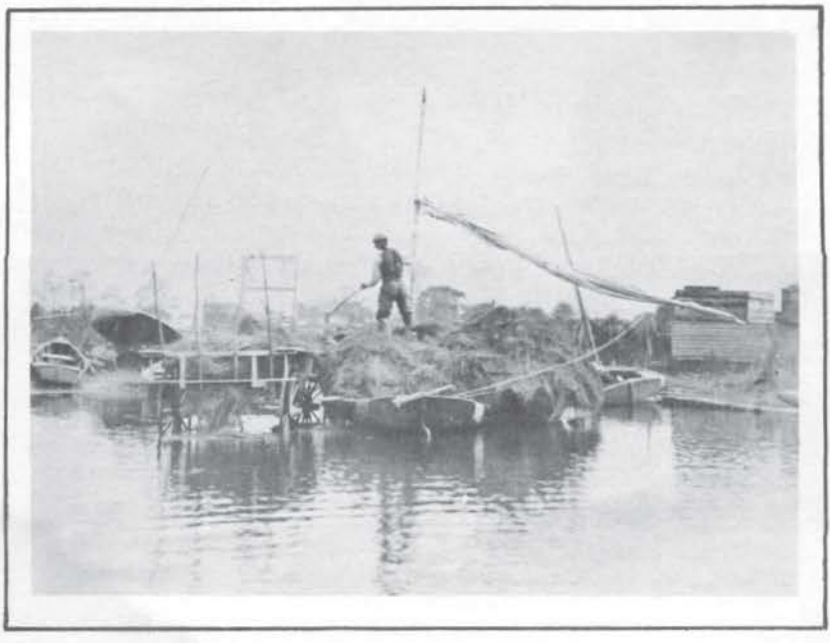
When the river was sufficiently frozen to support the weight of horses and equipment, ice was gathered and stored in the basements of local homes and in "ice houses" near the river. Salt hay was used to insulate the ice so that it would last into the warmer months.

Salt Haying

An important produce of the marshes bordering the river was the salt hay (Spartina patens) which in the seventeenth and eighteenth centuries was a major crop on Long Island. The location of salt hay meadows determined much of the desirable early real estate of Brookhaven Town in the days when marsh was more valuable than woodlands.

"Marshin" began in the fall on Marsh Day, the second Tuesday in September. If the salt hay meadow was publicly owned, each farmer had to claim a portion by planting his rake in it. He then set about cutting the hay with his scythe. Wooden blocks called "marsh shoes" were attached to the horses' feet to prevent them from getting stuck in the mud. After the grass was spread out to dry like real, or "English" hay, it was sold in the city for livery stables or for insulation, or used to feed cattle and sheep. One old bayman remembered this: "I didn't mind eatin' the bay food, though of course I never did touch any of that seaweed that they say those Japanese eat. But clams were as good as what God

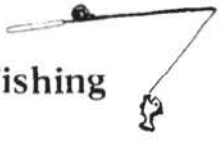
Loading salt hay gathered from
meadows along the Carmans River in the early 1900's.



made, but I tell you, tryin' to drink milk in which some cow had been fed salt hay was enough to sicken a boy."†

Duck Hunting

Some of the salt hay was used to camouflage hunting blinds for duck-shooting in the winter. The Indians taught duck-shooting to white settlers in the nineteenth century. The method was to sink down in the mud of the marshes or river and wait for the ducks. The Indians made duck decoys of a large stone with a smaller stone on top, and they taught this art to the Brookhaven settlers. As hunting along the Carmans River became more famous, club houses were built for the sportsmen who came to hunt teal, black duck, pintails, wigeons, mallards, and scaup on the river's marshes.



Fishing

In every stage of Long Island's history the fishing industry has been a lucrative business. Fishing supported early Long Island settlements like Bellport and Brookhaven, and oystering, scalloping, crabbing, eeling, and clamming have always been important to the people of the Carmans River area.

Early fishermen in Brookhaven Town were skeptical of fishermen from other areas. In 1742 two overseers were appointed by the Town to prohibit "forenors" from coming to "ketch" or carry away fish of any kind. To conserve what they knew to be a valuable resource, only two hundred cargoes of oysters could be gathered each year.

Between 1865 and 1871, twelve hundred acres of unproductive bay bottom were turned into oyster farms in the Great South Bay region, and oystering became a major occupation. Within a

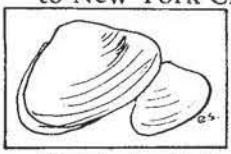
† Quoted by Seon Manley in Long Island Discovery, p.5.

decade oyster planting had increased rapidly and thousands of oysters were shipped to New York City and Europe every year.

Despite the efforts of the local baymen to discourage outsiders, many people were attracted to the successful oyster industry in Brookhaven. By 1891 three large companies had leased 2000 acres in the Great South Bay for oyster fields. The local baymen, feeling that the large oyster corporations had no legal right to lease natural oyster beds, brought the case to court. By the time they won their case in 1893, however, the natural oyster fields were nearly exhausted and oyster yields were insignificant. Many of the people of Brookhaven found themselves unemployed. Today most of the oyster industry is in the hands of a few large companies who breed their oysters under artificial conditions.

Scalloping as well as oystering was profitable for the baymen of the Brookhaven area. Both occupations use two dredges on each craft for scooping up shellfish, with two men usually working as partners. One dredge clears the bay's bottom of seaweed, while the other gathers up shellfish. In the 1860's as many as 150 bushels of scallops or oysters could be gathered each day with this dredging system.

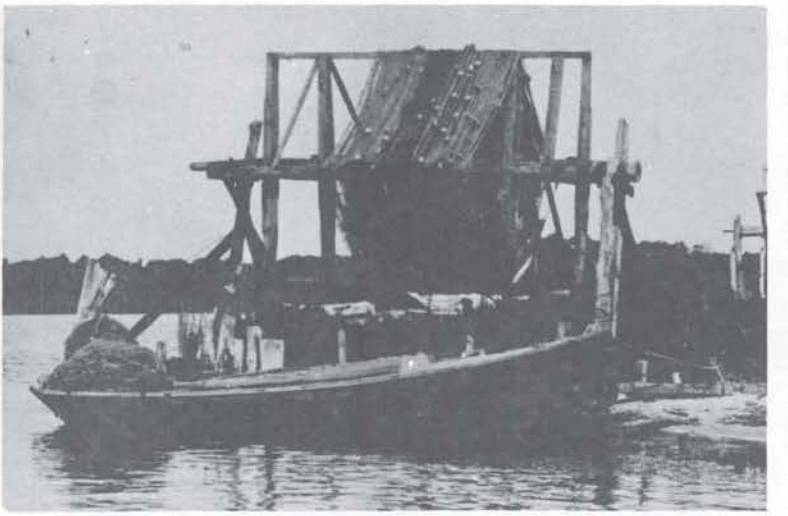
The original scallopers began work long before sunrise. They finished before noon to return to "scallop houses" on the beach. Here the scallops were transferred to the "openers," men, women, and children of all ages employed by the owners of the boat. The openers were paid a few cents a gallon for the scallop "meats" which were packed in tubs and shipped to New York City or the coastal towns of New England.



No one can deny the fact that Long Island and clams go together. Clams, clammers, and clam boats have always been associated with the Great South Bay, where most of New York State's hard clam industry is centered. One baymen was quoted as saying that although Long Island has got everything in the world except for pomegranates, "What's pomegranates when you have clam juice?".†

It was said of the early baymen that "they knew the bottom

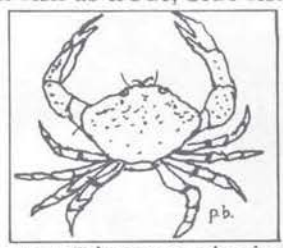
†Quoted by Seon Manley in Long Island Discovery, p. 234



Fishing boat on the Carmans River.

of the Bay like they know their wives face,"† and they knew their clams as well. Today local clammers can make up to $180 a day gathering Little Necks, three to four year-old clams, and five year-old Cherrystones. Clamming is presently a major source of income for many people living along the Great South Bay.

The Carmans River settlers also speared for eels and caught crabs along the river. Fishing was very important, and the river and bay continue to provide such fish as trout, blue fish, flounder, fluke, and weakfish.



For more than two hundred years the skill, knowledge, and hard work of the Brookhaven fisherman have provided us with fish, clams, oysters, and scallops. These industries are dependent on the health of the bay and the river. The water that the Carmans River empties into the Great South Bay must continue to permit edible aquatic life to flourish.

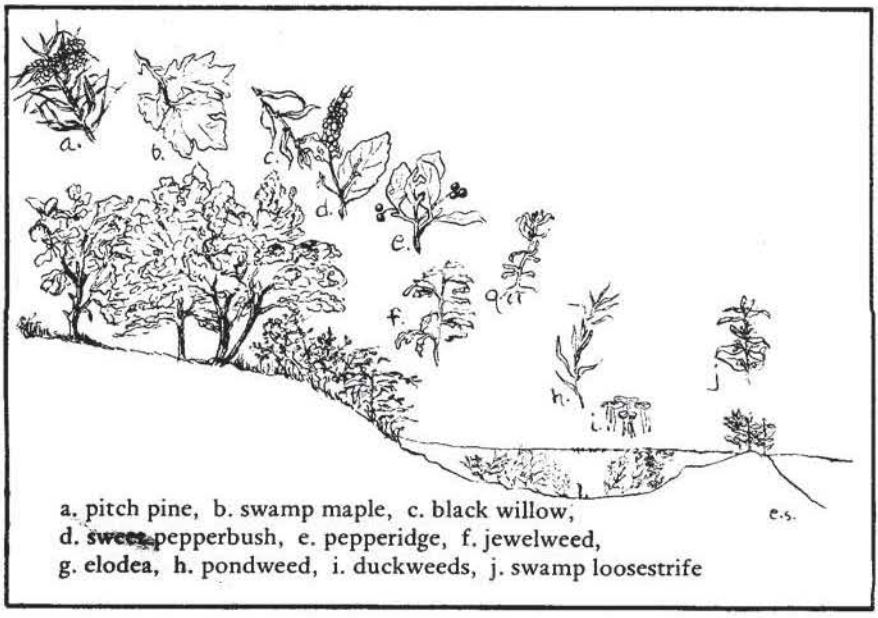
†Quoted by Seon Manley in Long Island Discovery, p. 237

Biology of the Carmans River

Like most waterways that have not been polluted, the Carmans River and its banks support dense populations of many forms of wildlife. The presence of both fresh and salt water in the river creates two very different environments: the upper freshwater region, and the lower salt marsh tidal area. The abundant plant and animal life is important both for its aesthetic and practical values.

Plants

The Carmans River basin provides an environment for a rich variety of plant life. The freshwater plants of the upper river differ greatly from those of the salt marsh, but both show the river to be an abundant and unspoiled resource.

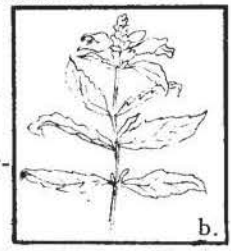


a. pitch pine, b. swamp maple, c. black willow,
d. sweet pepperbush, e. pepperidge, f. jewelweed,
g. elodea, h. pondweed, i. duckweeds, j. swamp loosestrife

Pepperidge trees and swamp maples, flanked by pitch pines which grow on higher ground, shade the northern portion of the river. Shrubs such as sweet pepperbush, chokeberry, rose, and blueberry thrive along the shores, while in tangled clumps on the water's edge are the brilliant flowers of touch-me-not, or jewelweed. Swamp loosestrife covers much of the shore as well as small islands in the middle of the river. Where the water is quiet, sphagnum moss flourishes on the banks. The river itself is the place to find tape grass, pondweed, watercress, and water starwort, plants whose healthy growth indicates the rapid flow and good oxygen supply in the river. Duckweeds on the water's surface provide food for waterfowl.

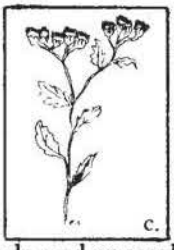
a.

Several species of rare plants also grow in the freshwater region of the Carmans River. Turtlehead, jack-in-the-pulpit, and lady's slippers are occasionally found as well as the striking red cardinal flower, one of North America's most brilliant wildflowers. The crested fern, recorded in only two other places on Long Island, grows in South Haven Park. These plants are extremely sensitive to pollution and are good indicators of high water quality.



b.

Once it passes South Haven Pond, the river widens and the vegetation changes. Reeds and salt hay now border the river's edge as swamp maples and pepperidge recede to higher ground to escape the saltier water. The great variety of plants found in the freshwater region gives way to a fewer number of species typical of the salt marsh.

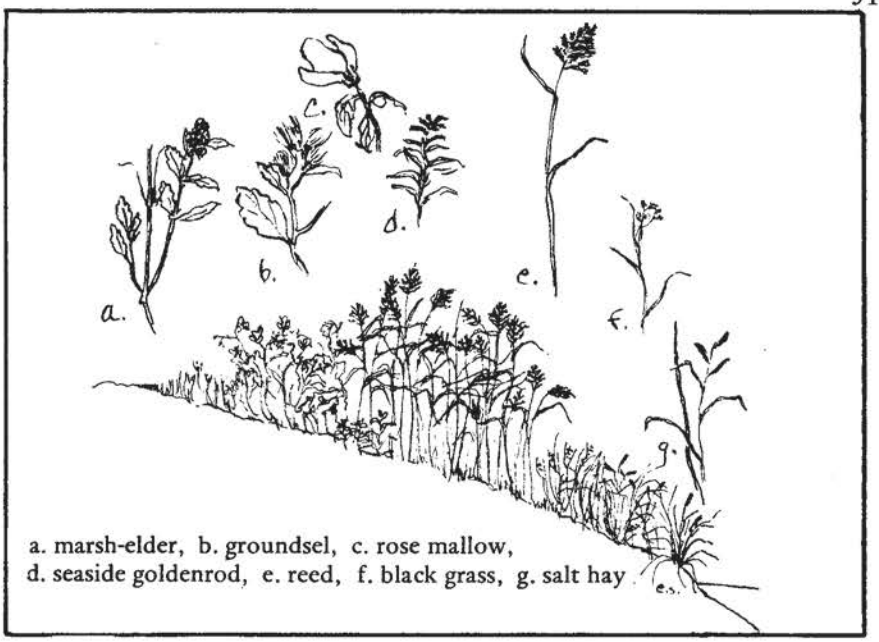


c.

Besides reeds and several species of salt hay, the principal vegetation of the tidal area consists of high-tide bushes (marsh-elder and groundsel), saltwort, swamp rose mallow, and seaside goldenrod. Among these plants the parasitic dodder, a bright orange colored vine which lacks chlorophyll, often grows. The grass-pink, a delicately rose-colored orchid, salt-marsh fleabane, and sea lavender are some of the more unusual plants found in the lower part of the river.

d.

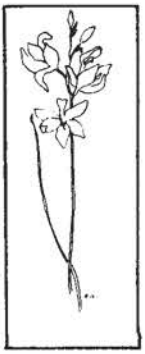
a. lady's slipper, b. turtlehead, c. salt-marsh fleabane, d. dodder



a. marsh-elder, b. groundsel, c. rose mallow,
d. seaside goldenrod, e. reed, f. black grass, g. salt hay

cardinal flower

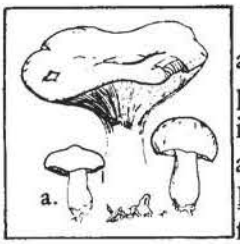
The plants of the Carmans River, from the brilliant cardinal flower on the banks of the upper river to the reedbeds of the salt marsh, provide both food and shelter for animals and a source of inspiration for nature lovers.



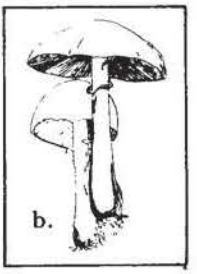
Mushrooms

These mushroom drawings illustrate a few of the species that grow in the Carmans River basin. Some of the more common poisonous species are the Amanita muscaria, Russula emetica, and Entoloma lividium. Amanita muscaria, commonly known as the fly mushroom, grows chiefly in the

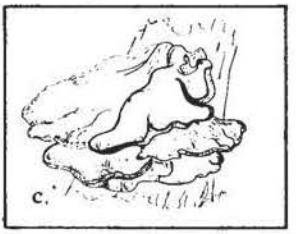
a. Amanita muscaria



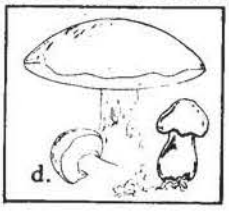
autumn in hardwood and conifer forests, open places, and bushy pastures. Russula emetica is found during summer and autumn in damp and even swampy places, especially near moss. Entoloma lividium, or livid entoloma, may be found in many diverse habitats, but especially under hardwood and coniferous trees.



Some of the edible mushrooms are Lepiota procera, Mycena galericulata, Polyporus sulphureus, and Armillaria mellea. These mushrooms are edible only during certain stages of their development, and it is very important to carefully identify any mushroom before eating it. Lepiota procera, or smooth lepiota, appears in the summer and autumn in meadows, fields, orchards, and gardens. Mycena galericulata, commonly called mycena, grows singly or in clusters on decayed logs and stumps of hardwoods. Sulphur polyporus, or Polyporus sulphureus, is inedible when the fungus is mature, but parts of the young specimens are excellent. From the middle of spring until the beginning or middle of autumn this brightly colored fungus grows in clusters from a single base on hardwood trees and sometimes on conifers. Armillaria mellea, or honey armillaria, may be eaten if the mature specimens and part of the stalk of the immature specimens are carefully removed. This mushroom grows in summer and autumn on the stumps and roots of oak trees as well as mulberry, willow, fir, and larch.

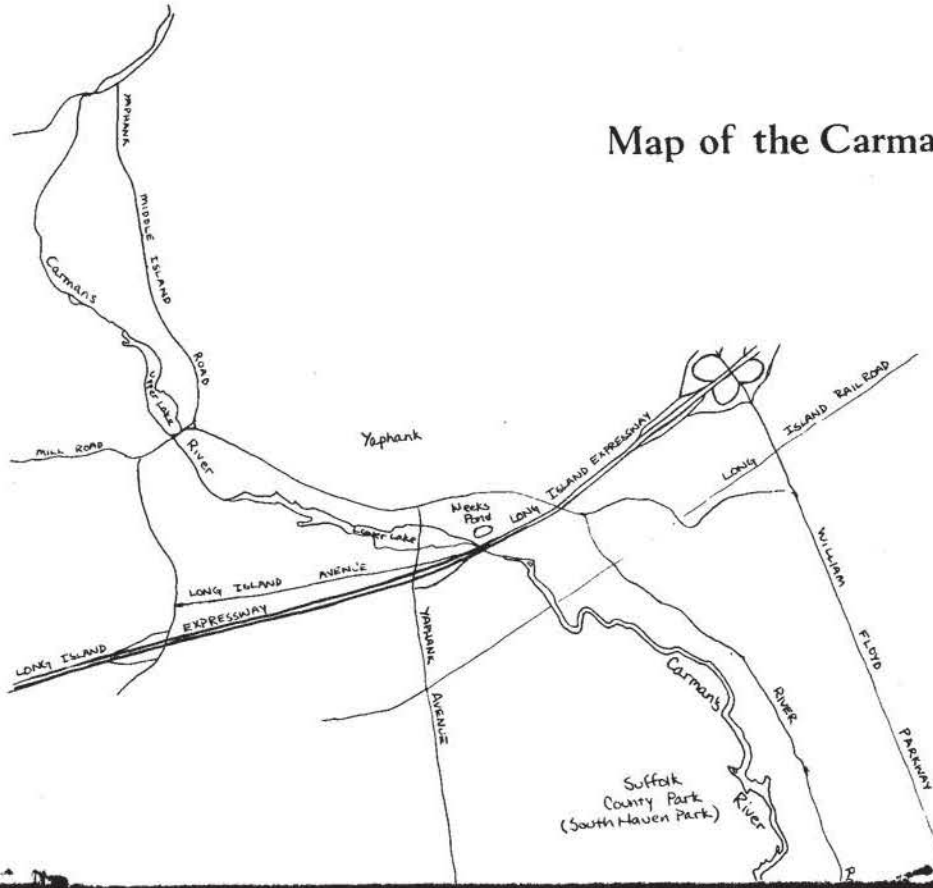


This listing is not meant to be used as an authoritative source for identifying mushrooms, many of which are very harmful if eaten. We hope, instead, to give an idea of how many different varieties may be found along the Carmans River. For a more complete list, please see Appendix 1.



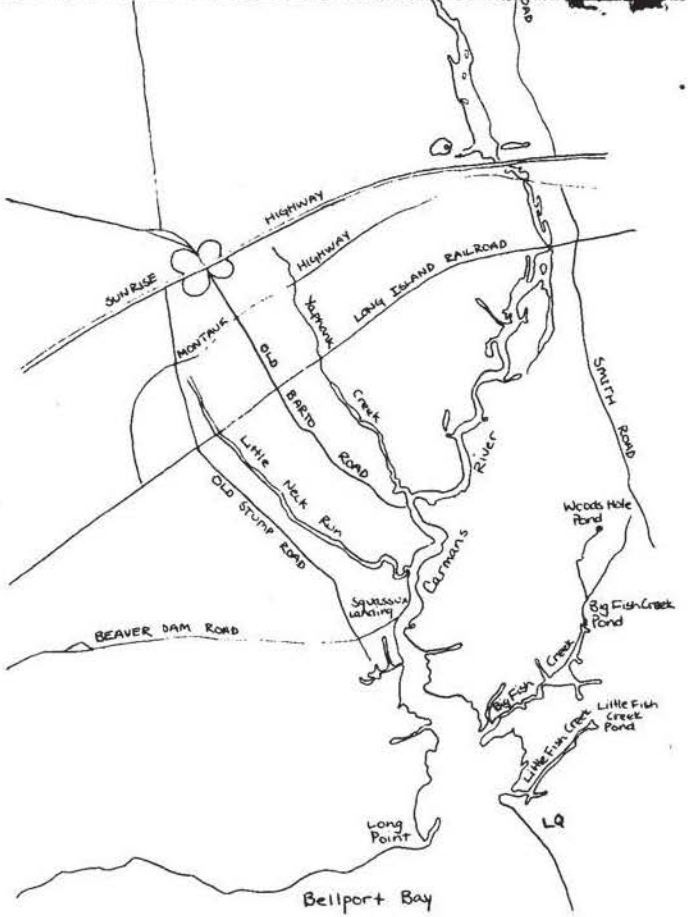
a. Russula emetica, b. Lepiota procera,
c. Polyporus sulphureus, d. Boletus edulis

Map of the Carmans River



The Carmans River is one of four major rivers on Long Island. The river starts as a freshwater stream in Yaphank and runs south through Upper and Lower Lakes, South Haven Pond, and into the Great South Bay.

The river is ten miles long and has a drainage basin of seventy-one square miles. Parkland and undeveloped private property, as well as a few residential and agricultural areas, border most of the river.



Edible Plants

The Carmans River basin provides a natural environment for a valuable and an inexpensive food source. Unless the river is protected from pollution and development, many of these nourishing and palatable foods will be lost. Some of the more common edible plants that flourish along the Carmans River are:

1. Wild Watercress (Nasturtium officinale)

Wild watercress, an herb rich in vitamins and minerals, is excellent in salads, garnishes, as a sandwich filling, or in herb butter. Available every month of the year, watercress flourishes in running streams where the water is from one to six inches deep.

2. Pokeweed (Phytolacca americana)

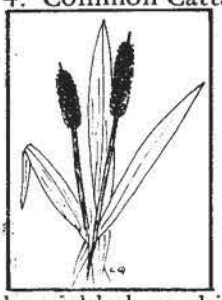
Pokeweed, used for pickling and as a leafy green, is one of the best known and most widely used vegetables in America. The best time for eating poke is when it is young with tender sprouts. Even then one must be careful to gather only the young, unfolded leaves at the top of the sprout because the seeds, old stems, and roots are poisonous. Because the roots of the poke contain phytolaccin which is slightly narcotic and can be poisonous, poke can be a powerful medicinal herb as well as a vegetable.

3. Common Milkweed (Asclepias sp.)

Milkweed provides us with four nutritious vegetables beginning with the young shoots which can be served like asparagus. One can also eat the newly opened leaves like spinach, the unopened flower buds like broccoli, and

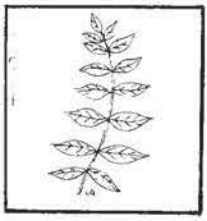
the young pods. To prepare all four of these vegetables and get rid of the bitter taste, boil and drain the vegetables at least three times.

4. Common Cattail (Typha latifolia)



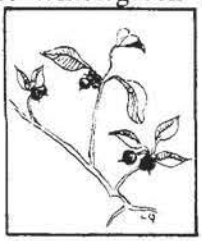
A number of foods can be prepared from the common cattail, beginning with the green bloom spikes which may be gathered and cooked in the late spring. From fall to spring a white nutritious flour can be made from the center of the rootstocks. At the ends of the rootstocks are the next year's dormant sprouts which can be pickled, used in salads, or cooked as a vegetable. Where the sprouts and the root stock meet is a starchy core that can be roasted, boiled, or cooked with meat. Finally, one should note the bright yellow pollen which can be used for a colorful and nutritious ingredient in many foods.

5. Black Walnut (Juglans nigra)



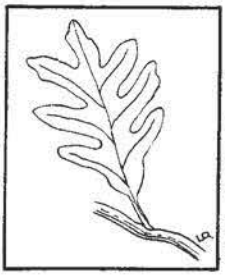
Black walnut is hard to shell except with a hammer or a vice, but one will find it well worth the time. The highly flavored meat, rich in oil, can be used in cakes, nutbread, and muffin recipes.

6. Wintergreen (Gaultheria procumbens)



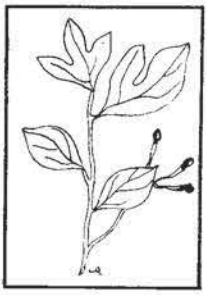
Depending on where it comes from, wintergreen has fifteen to twenty other common names which suggest the broad extent of its use in local herbal lore and folk medicine. Both the red berries and the leaves are edible and have a very satisfying taste. The best way to make wintergreen tea is by fermentation which brings out the gaultheria oil, the flavoring substance of wintergreen. Unless this fermentation takes place, one will end up with a very bland tea.

7. White Oak (Quercus alba)



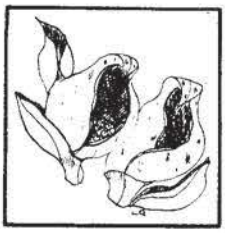
White oak provides us with edible acorns which can be used either raw or cooked. By shelling out acorn kernels one can make acorn grits. Also, acorn meal can be used in bread and griddle cakes by grinding dry, raw acorns, mixing the flour with boiling water, and straining it.

8. Sassafras (Sassafras albidum)



Sassafras, the first plant product exported from New England, belongs to the Lauraceae family, a family which contains many aromatic plant species. In the early 1600's, sassafras was considered a great medicinal herb but now its medicinal use has lessened. Presently, the oil is used mainly as a flavoring for medicines, soft drinks, and confections. To make sassafras tea, boil a bunch of roots in water until the tea turns a red color. Sweeten to taste. Dried sassafras leaves can also be useful if they are crushed into powder and used in soups, stews, chowders, and gravies. One can also chew this pleasantly palatable leaf straight from the tree.

9. Skunk Cabbage (Symplocarpus foetidus)



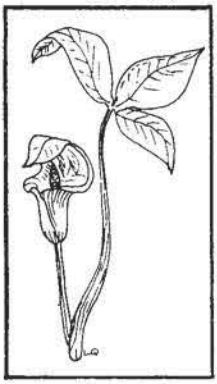
When fully grown, skunk cabbage resembles a head of cabbage and when the tight cones of newly grown leaves are cut and broken, it gives off an odor similar to that of a skunk. Interested skunk cabbage eaters must be wary of the disagreeable odor that is given off when the cones of the leaves are cooked. Although a very common plant along the river, skunk cabbage becomes a palatable food only after a lengthy process of drying the leaves and roots for about six months. This period of time will allow the skunk cabbage to loose its pungency and still retain a pleasant

taste in foods such as skunk cabbage pancakes and pudding.

10. Sheep Sorrel (Rumex acetosella)

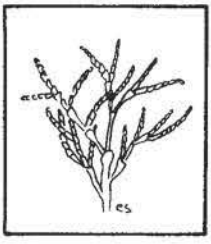
Sheep sorrel or sourgrass is often eaten like spinach or in soups. The early settlers used sheep sorrel in soups, salads, and drinks. A sour drink similar to lemonade can be made by cleaning the leaves and simmering them for twenty minutes in water.

11. Jack-in-the-Pulpit or Indian Turnip (Arisaema trifolium)



Jack-in-the-pulpit is a member of the arum family. This family has acrid and peppery qualities as a result of millions of microscopic needle-like crystals of oxalate of lime. Boiling does not dispel the pungent taste of the root. A prolonged drying process of at least two months is necessary to break down the crystals thus making the roots palatable. These roots can be eaten without further preparation except a brief toasting to make them crisp. By crumbling the roots, one can make a jack-in-the-pulpit cereal or a type of flour that has a taste similar to that of cocoa. This flour lacks a proper amount of gluten so it should be mixed half and half with regular flour to be used in all cookie, cake, and muffin recipes. One must remember that to make jack-in-the-pulpit edible requires a long drying process, but it is well worth the time when one realizes its nourishing benefits.

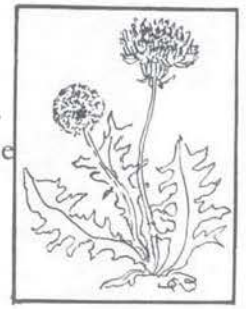
12. Saltwort or Glasswort (Salicornia sp.)

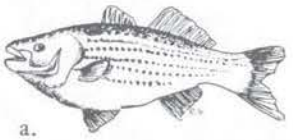


Glasswort can be used in salads or as a pickle. To make pickles, gather fresh glasswort and pack into pint jars placing stems vertically. Combine one quart vinegar, one-half cup sugar, three tablespoons mixed pickling spices, one sliced onion, and six dried bayberry

leaves. Boil this combination for ten minutes, then pour it over the saltwort, filling the top of the jar with the mixture. Seal and store for at least three weeks before eating.

Some of the other edible plants that flourish along the Carmans River are: sensitive fern, partridge berry, hemlock, sweet fern, dwarf sumac, and dandelion. These plants are not quite as abundant as the twelve species described above, but when they are found they provide a nourishing food source.

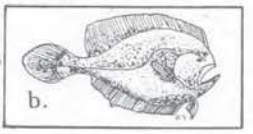




a.

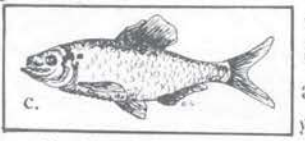
Fish

Over forty species of fish are found in the Carmans River. The New York State Conservation Department stocks over eight thousand trout in the river each year making brook, brown, and rainbow trout abundant throughout the freshwater portion of the river. Largemouth bass and a large number of panfish, including yellow perch and sunfish, live in the lake at South Haven Park.



b.

Each spring thousands of alewives migrate up the Carmans River to spawn below the dam at South Haven Pond. Sea-run brown trout reach weights up to eight pounds from feeding on the large food supply in the tidal portion of the river. The brackish waters also contain large populations of white perch and carp. Near the river's mouth, where the salinity is high, weakfish, snappers, and striped bass are found in good numbers. These fish provide a good food source and an exciting sport for local residents.



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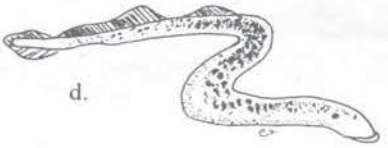


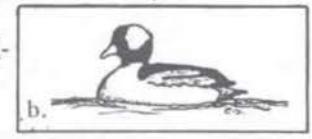
d.

striped bass, b. flounder, c. alewife, d. sea lamprey

Birds

The bird life of the Carmans River is abundant and varied. The woods and marshes that border the river abound with many species of land birds, while the waters harbor great numbers of waterfowl.

During the past thirty years over 240 species of birds have been recorded in the Carmans River area, 108 of which have bred along the river. The rare and endangered osprey regularly nests in the woods on the eastern bank of the river. In 1973 a pair of ospreys produced two young in a Brookhaven nest; this represents the westernmost breeding record on Long Island today.

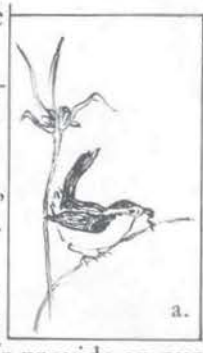


During the winter months the lower reaches of the river provide food and shelter for many diving ducks such as bufflehead, greater scaup, and canvasback. At the upper end of the lake at South Haven Park as many as 800 canvasback can usually be found. Several hundred wintering American wigeon, along with the rare European wigeon, can often be sighted in this area. A few snow geese, whistling swans, and a single tufted duck from Europe have added variety to the masses of waterfowl gathered at South Haven Pond. A bald eagle and some fifty great blue herons often winter in the lower reaches of the river, where rough-legged hawks, marsh hawks, and short-eared owls fly over the salt marsh hunting for small mammals.

Early spring is heralded by the arrival of large flocks of red-winged blackbirds; the males arriving first to establish breeding territories in the reedbeds. As the winter waterfowl depart for the north, waves of warblers and other small insectivorous birds arrive and feed along the river before also traveling to northern breeding grounds. In mid-May, when as many as twenty species of warblers can be seen searching for insects, the peak of migration is reached. Terns, skimmers, and shorebirds

a. Virginia rail, b. bufflehead, c. Blackburnian warbler

come to rest and feed at the river's mouth. Long-billed marsh wrens build their round nests in the sedges and tall marsh grasses. By early June some warbler species have settled down to breed locally together with such talented songsters as the wood thrush, brown thrasher, and veery. The hermit thrush, which is usually associated with coniferous forests further north, breeds in the deciduous woods of the river area. The most beautiful of all North American waterfowl, the wood duck, selects a hollow tree for its nest site in the woodlands bordering the river. The extensive marshlands of the lower river provide an excellent nesting area for the abundant black duck. Introduced into the area many years ago, the Canada goose, mute swan, and mallard also breed locally. Other common game birds are the bobwhite and ring-necked pheasant.


a.

As summer nears its end, the fall migration begins. When the northwest winds prevail, many hawks and even the rare peregrine falcon can be seen swiftly passing south. For the past ten years a Federal bird banding station located on the salt marshes of the lower river has recorded an average of about 3500 birds trapped in mist nets during each fall migration. During mid-October, activities at the banding station reach their peak with over one hundred small birds of various species netted each morning. Even through mid-November large flocks of goldfinches, pine siskins, and myrtle warblers roam the marshes, feeding on the seeds of the high-tide bush or marsh elder.


b.

By late November the winter residents are well established. In addition to the waterfowl, such northern land birds as the white-throated sparrow, red-breasted nuthatch, and evening grosbeak have settled down into their winter quarters.

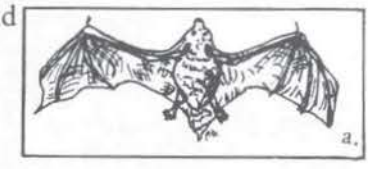
Thus it is clear that a great variety of birds depend on the Carmans River throughout the seasons.


c.

a. long-billed marsh wren, b. ovenbird, c. canvasback

Mammals

There are more than thirty species of mammals found in the Carmans River area, many of them so secretive that they are rarely seen except by the patient and careful observer. Some of these mammals, such as bats, can be encountered only at dusk, or during the day as they sleep in old abandoned buildings. The flying squirrel can rarely be found except when it is flushed out of an old woodpecker hole where it sleeps during the day. Other mammals, like the mole, live underground. The masked shrew, which is smaller than a man's little finger and lives in dense ground cover, is seldom seen, as is the short-tailed shrew, a common nocturnal animal which hunts for insects in the forest leaf litter.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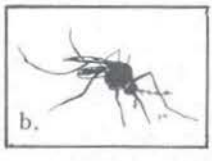
b.


c.

The tiny masked shrew benefits the farmer by eating its own weight in insects every day. Bats also help to control the mosquito population. At least seven species of bats are found in the river area including the migratory red bat. On a summer night the mercury vapor lights at Squassux Landing attract winged insects which bats gather to catch.

There are several species of mice along the Carmans River which reproduce so rapidly that they would soon overpopulate the area if it were not for their natural predators such as hawks, owls, snakes, foxes, and weasels. The meadow vole is especially common on the salt marshes along the lower river. Because the meadow vole is always able to recover from the frequent flooding along the river it is a valuable food source for marsh hawks, short-earred owls, and rough-legged hawks. The chipmunk has become increasingly common in the Carmans River area, perhaps because of the decrease in the populations of its natural enemies such as the great horned owl.

The most familiar larger animals in the area are the white-

a. little brown bat, b. mosquito, c. beetle

tailed deer, the cottontail rabbit, and the gray squirrel. The raccoon and opossum are also quite common as evidenced by the numbers seen dead on the roads. The red fox, woodchuck, long-tailed weasel, and mink still exist in small populations in the wilder sections along the river.

The muskrat is very common along the banks of the lower river although its home, a large mound of vegetation in the reed beds of the salt marshes, is more often seen than the builder himself. Because of the recent decrease in the demands for muskrat pelts, the population of this interesting and harmless animal has increased. All the animals of the Carmans River area should receive full protection so that they will continue to provide enjoyment and interest for future generations.

a. gray squirrel, b. weasel

Conclusion

For many years the Carmans River has enriched the way of life in Brookhaven Town. As one of the four major rivers on Long Island, it continues to offer a wide variety of wildlife. The history of the river reflects its importance as a vital resource from which both the Indians and, later, the white settlers gained produce. It also furnished whalers and fisherman with an outlet to the bay and ocean.

Today the river basin is an unspoiled and aesthetically appealing area, inspiring for anyone interested in nature. As long as the public is aware of the dangers that careless use of the river will cause, the Carmans River will remain an important asset to our community. If this booklet fosters such awareness, its purpose will have been fulfilled.

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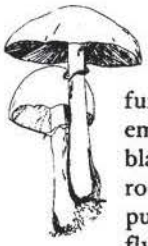
Appendix A
Plants of the Carmans River Basin

Scientific name	Common name
Division Chlorophyta	green algae
Spirogyra sp.	spirogyra
Microspora sp.	
Polycystis sp.	
Enteromorpha sp.	
Ulva lactuca	sea lettuce
Division Rhodophyta	red algae
Gelidium sp.	
Ceramium sp.	
Division Chrysophyta	diatoms
Fragilaria sp.	
Division Mycota	lichens and fungi
Family	
Graphidaceae	
Graphis scripta	
Lecideaceae	
Lecidea sp.	
Bacidea sp.	
Cladoniaceae	
Baromyces roseus	
Cladonia alpestris	
C. chlorophaea	
C. coniocraea	
C. bacillaris	
C. cristatella	
C. didyma	
C. mitis	
C. evansii	
C. pyxidata	
C. rangiferina	
Pertusariaceae	
Pertusaria sp.	
Lecanoraceae	
Lecanora sp.	
Haematomma sp.	
Parmeliaceae	
Parmelia caperata	
P. perforata	
P. rudecta	
P. saxatilis	
Hypogyminia physodes	
Cetraria ciliaria	



Usnaceae	
Alectoria nidulifera	
Usnea strigosa	
Teloschistaceae	
Xanthoria parietina	
Physciaceae	
Physia aipolia	fungi
Russula emetica	emetic russula
R. nigricans	blackening russula
Collybia radicata	rooting collybia
Laccaria ochropurpurea	purplish ochre laccaria
Amanita muscaria	fly amanita
A. verna	spring amanita
Entoloma lividium	leaden entoloma
Lepiota procera	smooth lepiota
Amanitopsis vaginata	sheathed amanitopsis
Tricholoma personatum	masked tricholoma
T. tultilan	red haired tricholoma
Clitocybe aurantiaca	yellow clitocybe
Mycena galericulata	capped clitocybe
Lycoperdon pyriforme	pear shaped puffball
Polyporus sulphureus	sulphur mushroom
P. betulinus	birch fungus
P. versicolor	variegated polyporus
Phallus impudicus	common stink horn
Armillaria mellea	honey armillaria
Boletus edulis	edible boletus
Division Schizophyta	
	bacteria
Division Bryophyta	
Sphagnum sp.	sphagnum moss
Atrichium sp.	
Thiudium delicatulum	fern moss
Fontinalis dalecarlica	water moss
Division Pteridophyta	
Family	
Lycopodiaceae	
Lycopodium obscurum	ground pine
L. complanatum	ground cedar
Equisetaceae	
Equisetum arvense	field horsetail
Ophioglossaceae	
Botrychium dissectum	grape fern
Osmundaceae	
Osmunda regalis	royal fern
O. cinnamomea	cinnamon fern

Polypodiaceae	
Onoclea sensibilis	sensitive fern
Dennstaedtia punctilobula	hay scented fern
Polystichum acrostichoides	Christmas fern
Dryopteris austriaca	spinulose wood fern
D. cristata	crested fern
D. marginalis	evergreen wood fern
Thelypteris noveboracensis	New York fern
T. palustris	marsh fern
Woodwardia areolata	netted chain fern
W. virginica	Virginia chain fern
Athyrium filix-femina	lady fern
Pteridium aquilinum	bracken
Polypodium vulgare	polypody
Division Spermatophyta	
Family	
Pinaceae	
Tsuga canadensis	hemlock
Pinus strobus	white pine
P. rigida	pitch pine
Cupressaceae	
Juniperus virginiana	red cedar
Typhaceae	
Typha angustifolia	cattail
T. latifolia	cattail
Sparganiaceae	
Sparganium sp.	bur-reed
Najadaceae	
Potamogeton sp.	pond weed
Zostera marina	eel grass
Ruppia maritima	wigeon grass
Alismaceae	
Sagittaria sp.	arrowhead
Hydrocharitaceae	
Anacharis canadensis	elodea
Vallisneria americana	tape grass
Gramineae	
Anthoxanthum odoratum	sweet vernal grass
Bromus tectorum	brome grass
Dactylis glomerata	orchard grass
Distichlis spicata	spike grass
Elymus virginicus	Virginia wild rye
Festuca rubra	red fescue
Panicularia grandis	reed meadow grass
Panicum clandestinum	corn grass
P. virgatum	switch grass
Phragmites communis	reed

Poa pratensis	Kentucky blue grass
Spartina alterniflora	salt water cord grass
S. cynosuroides	salt reed grass
S. patens	salt meadow grass, salt hay
S. pectinata	cord grass
Cyperaceae	
Cyperus flavescens	sedge
C. polystachyos	
C. filicinus	
C. odoratus	
C. strigosus	
C. globulosus	
C. erythrorhizos	
C. esculentus	
C. compressus	
C. dentatus	
Dulichium arundinaceum	
Eleocharis geniculata	
E. acicularis	
E. palustris	
E. ambigens	
E. halophila	
E. microcarpa	
Fimbristylis autumnalis	
Scirpus americanus	
S. olneyi	
S. smithii	
S. validus	
S. robustus	
Eriophorum virginicum	
Rhynchospora capitellata	
R. knieskernii	
R. fusca	
Cladium mariscoides	
Carex brevior	
C. lurida	
C. stipata	
C. crinita	
C. collinsii	
C. folliculata	
C. comosa	
C. intumescens	
C. louisianica	
Araceae	
Arisaema triphyllum	jack-in-the-pulpit
Symplocarpus foetidus	skunk cabbage

Lemnaceae	
Lemna minor	duckweed
Spirodela sp.	duckweed
Commelinaceae	
Commelina sp.	Canada day flower
Liliaceae	
Asparagus officinalis	asparagus
Maianthemum canadense	wild lily-of-the valley
Smilax sp.	catbrier
Iridaceae	
Iris versicolor	blue flag iris
Orchidaceae	
Spiranthes cernua	nodding ladies' tresses
Cypripedium acaule	lady slipper
Calopogon pulchellus	grass pink orchid
Salicaceae	
Salix nigra	willow
Myricaceae	
Myrica pensylvanica	bayberry
M. aspenifolia	sweet fern
M. gale	sweet gale
Juglandaceae	
Juglans nigra	black walnut
Betulaceae	
Alnus sp.	alder
Betula populifolia	gray birch
Fagaceae	
Quercus ilicifolia	scrub oak
Q. alba	white oak
Q. nigra	black oak
Q. borealis	red oak
Polygonaceae	
Polygonum sagittatum	arrow leaved tearthumb
P. sp.	smartweed or knotweed
Rumex crispus	sour dock
R. obtusifolius	bitter dock
R. acetosella	sheep sorrel
Chenopodiaceae	
Salicornia europaea	saltwort
Atriplex patula	orache
Suaeda maritima	sea-blite
Phytolaccaceae	
Phytolacca americana	pokeberry
Caryophyllaceae	
Lychnis alba	white campion
Spergularia rubra	sand spurrey

Ceratophyllaceae	
Ceratophyllum demersum	hornwort
Nymphaeaceae	
Cabomba caroliniana	cabomba
Ranunculaceae	
Clematis virginiana	virgin's bower
Thalictrum polygamum	meadow rue
Ranunculus septentrionalis	swamp buttercup
Lauraceae	
Lindera benzoin	spice bush
Sassafras albidum	sassafras
Papaveraceae	
Chelidonium majus	celandine
Cruciferae	
Cakile edentula	sea rocket
Lepidium virginicum	peppergrass
Nasturtium officinale	watercress
Barbarea vulgaris	wintercress
Droseraceae	
Drosera rotundifolia	round leafed sundew
Crassulaceae	
Tillaea aquatica	pygmy weed
Platanaceae	
Platanus occidentalis	sycamore
Rosaceae	
Amelanchier canadensis	shadbush
Potentilla anserina	silverweed
P. canadensis	dwarf cinquefoil
Prunus serotina	wild black cherry
P. virginiana	chokecherry
Rosa multiflora	rose
R. virginiana	wild or swamp rose
Sanquisorba canadensis	Canadian burnet
Rubus sp.	raspberry
Aronia arbutifolia	red chokeberry
Fabaceae	
Apios americana	groundnut
Lathyrus maritimus	beach pea
Lupinus perennis	wild lupine
Oxalidaceae	
Oxalis stricta	sorrel
Callitrichaceae	
Callitriche heterophylla	larger water starwort
Anacardiaceae	
Rhus copallina	winged sumac
R. radicans	poison ivy
R. vernix	poison sumac

Aceraceae	
Acer rubrum	red or swamp maple
Balsaminaceae	
Impatiens biflora	touch-me-not
Vitaceae	
Parthenocissus quinquefolia	Virginia creeper
Vitis labrusca	grape
Malvaceae	
Hibiscus palustris	rose mallow
Hypericaceae	
Hypericum perforatum	St. Johnswort
H. mutilum	dwarf St. Johnswort
Triadenum virginicum	marsh St. Johnswort
Violaceae	
Viola primulifolia	primrose leaved violet
V. palustris	marsh violet
Lythraceae	
Decodon verticillatus	swamp loosestrife
Onagraceae	
Oenothera biennis	evening primrose
Araliaceae	
Aralia nudicaulis	sarsaparilla
Umbelliferae	
Daucus carota	wild carrot
Cornaceae	
Nyssa sylvatica	pepperidge tree
Cornus florida	flowering dogwood
Clethraceae	
Clethra alnifolia	sweet pepperbush
Ericaceae	
Leucothoe racemosa	fetterbush
Rhododendron viscosum	swamp azalea
Vaccinium corymbosum	highbush blueberry
V. oxycoccus	cranberry
V. vacillans	lowbush blueberry
Epigaea repens	trailing arbutus
Gaultheria procumbens	wintergreen
Chimaphila maculata	spotted wintergreen
Monotropa uniflora	indian pipe
Primulaceae	
Anagallis arvensis	scarlet pimpernel
Lysimachia quadrifolia	whorled loosestrife
L. terrestris	swamp candles
Asclepiadaceae	
Asclepias incarnata	swamp milkweed
A. sp.	milkweed

Boraginaceae	
Myosotis sp.	forget-me-not
Verbanaceae	
Verbena hastata	
V. urticifolia	
Labiatae	
Lycopus sp.	water horehound
L. sp.	bugleweed
Mentha sp.	mint
Teucrium canadense	germander
Blephilia ciliata	downy wood mint
Solanaceae	
Solanum dulcamara	nightshade
S. nigrum	black nightshade
Scrophulariaceae	
Linaria canadense	blue toadflax
L. vulgaris	butter and eggs
Verbascum thapsus	mullein
Gerardia sp.	purple gerardia
Chelone glabra	turtlehead
Lentibulariaceae	
Utricularia sp.	bladderwort
Plantaginaceae	
Plantago major	common plantain
P. lanceolata	English plantain
Rubiaceae	
Mitchella repens	partridge berry
Caprifoliaceae	
Lonicera japonica	Japanese honeysuckle
Sambucus canadensis	elderberry
Viburnum dentatum	arrowwood
Campanulaceae	
Lobelia cardinalis	cardinal flower
Compositae	
Achillea millefolium	yarrow
Aster novi-belgii	New York aster
A. dumosus	bushy aster
Bidens sp.	beggar's tick
B. sp.	tickseed sunflower
Chrysanthemum leucanthemum	
Cirsium arvense	Canada thistle
C. pumilum	pasture thistle
Erigeron annuus	fleabane
E. philadelphicus	fleabane
E. canadensis	horseweed
Eupatorium hyssopifolium	hyssop-leaved thoroughwort

Eupatorium perfoliatum	boneset
Gnaphalium obtusifolium	sweet everlasting
Hieracium florentinum	king devil
Iva frutescens	marsh elder
Lactuca canadensis	Canada lettuce
Solidago fistulosa	goldenrod
S. rugosa	pyramid goldenrod
S. sempervirens	seaside goldenrod
S. tenuifolia	slender fragrant goldenrod
Senecio vulgaris	common groundsel
Baccharis halimifolia	hightide bush
Mikania scandens	climbing hempweed
Pluchea purpurascens	salt marsh fleabane

Species names according to Gleason, 1963.

Appendix B

Invertebrates of the Carmans River Basin

Phylum Porifera	
Microciona prolifera	red beard sponge
Phylum Coelenterata	
Aurelia aurita	stinging nettle
Sagartia luciae	sea anemone
Phylum Ctenophora	
Mnemiopsis leidyi	comb jelly
Pleurobrachia pileus	comb jelly
Phylum Rhynococoela	
Cerebratulus sp.	ribbon worm
Phylum Ectoprocta	
Membranipora sp.	bryozoan
Phylum Annelida	
Pectinaria gouldii	trumpet worm
Hydroides dianthus	carnation worm
Glycera sp.	blood worm
Phylum Arthropoda	
Balanus balanoides	rock barnacle
B. eburneus	ivory barnacle
Callinectes sapidus	blue claw crab
Erichsonella attenuata	isopod
Grubia compta	amphipod
Halacarus sp.	water mite
Idotea baltica	isopod
Libinia dubia	spider crab
Microdeutopus gryllotalpa	amphipod
Orchestia palustris	amphipod
Palaemonetes pugio	sand shrimp
Limulus polyphemus	horseshoe crab
Crangon sp.	shrimp
Panopus sp.	crab
Phylum Mollusca	(see Appendix C)
Phylum Echinodermata	
Thyone briareus	sea cucumber
Phylum Chordata	
Botryllus schlosseri	sea squirt
Molgula sp.	sea squirt

Appendix C

Mollusca of the Carmans River Basin

Class Gastropoda

Bittium alternatum	alternate bittium
Crepidula fornicata	slipper shell
Crepidula plana	eastern white slipper shell
Epitonium rupicola	brown-banded wentletrap
Ilyanassa obsoleta	eastern mud nassa
Eupleura caudata	thick-lipped drill
Mitrella lunata	lunar dove shell
Nassarius vibex	common eastern nassa
Urosalpinx cinerea	oyster drill
Embictonia fuscata	nudibranch
Hermaea cruciata	sacoglossan
Helisoma anceps	keeled rams horn
Melampus bidentatus	salt marsh snail
Physa heterostropha	tadpole snail
Zonitoides arboreus	tree zonite snail

Class Bivalvia

Aequipecten irradians	bay scallop
Anadara ovalis	blood ark
Anomia simplex	jingle shell
Crassostrea virginica	oyster
Ensis directus	Atlantic jackknife clam
Gemma gemma	amethyst gem clam
Laevicardium mortoni	Morton's egg cockle
Mercenaria mercenaria	northern quahog, common clam
Modiolus demissus	ribbed mussel
Mulinia lateralis	small surf clam
Musculium sp.	fingernail clam
Mya arenaria	soft clam
Mytilus edulis	blue mussel
Petricola pholadiformis	false angel wing
Sphaerium rhomboideum	fingernail clam
Tagelus plebeius	stout razor clam
Teredo navalis	shipworm

Appendix D

Fish of the Carmans River

Salmo gairdnerli	rainbow trout
S. trutta	brown trout
Salvelinus fontinalis	brook trout
Perca flavescens	yellow perch
Lepomis macrochirus	bluegill sunfish
L. gibbosus	pumpkinseed
Esox niger	chain pickerel
E. americanus	grass pickerel
Micropterus salmoides	largemouth bass
Ictalurus nebulosus	brown bullhead
Cyprinus carpio	carp
Roccus americanus	white perch
R. saxatilis	striped bass
Alosa pseudoharengus	alewife
Brevoortia tyrannus	Atlantic menhaden
Anguilla rostrata	American eel
Cynoscion regalis	weakfish
Pomatomus saltatrix	bluefish
Pseudopleuronectes americanus	winter flounder
Paralichthys dentatus	summer flounder
Spheroides maculatus	northern puffer
Prionotus carolinus	sea robin
Opsanus tau	toadfish
Menticirrhus saxatilis	northern kingfish
Tautogolabrus adspersus	cunner
Fundulus heteroclitus	common killifish
F. diaphanus	freshwater killifish
Cyprinodon variegatus	broad killifish
Menidia menidia	Atlantic silversides
Strongylura marinus	needlefish
Syngnathus fuscus	pipefish
Stephanolepis hispidus	common filefish
Petromyzon marinus	sea lamprey
Cottus cognatus	common slimy muddler
Eucalia inconstans	brook stickleback
Achirus fasciatus	hog chocker
Microgadus tomcod	tomcod
Boleosoma olmstedi	darter
Tautoga onitis	tautog
Anchoviella mitchilli	anchovy

Appendix E

Reptiles and Amphibians of the Carmans River Basin

snapping turtle
spotted turtle
eastern box turtle
musk turtle
mud turtle
diamond-backed terrapin
northern brown (De Kay's) snake
red-bellied snake
eastern garter snake
eastern ribbon snake
eastern hognose snake
northern ringneck snake
eastern worm snake
northern black racer
smooth green snake
eastern milk snake
marbled salamander
spotted salamander
red-backed salamander
four-toed salamander
red spotted newt
eastern spadefoot toad
Fowler's toad
spring peeper
gray tree frog
bullfrog
green frog
northern leopard frog
pickerel frog
wood frog

Appendix F

Birds of the Carmans River Basin

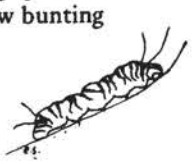
common loon
red-throated loon
horned grebe
eared grebe
pied-billed grebe
double-crested cormorant
great blue heron
green heron
little blue heron
cattle egret
common egret
snowy egret
black-cr. night heron
least bittern
American bittern
glossy ibis
mute swan
Canada goose
brant
snow goose
mallard
black duck
pintail
green-winged teal
blue-winged teal
European wigeon
American wigeon
shoveler
wood duck
red head
ring-necked duck
canvasback
tufted duck
greater scaup
lesser scaup
common goldeneye
bufflehead
ruddy duck
hooded merganser
common merganser
red-breasted merganser
goshawk
sharp-shinned hawk
Cooper's hawk
red-tailed hawk
red-shouldered hawk
broad-winged hawk
rough-legged hawk
golden eagle
bald eagle
marsh hawk
osprey
peregrine falcon
pigeon hawk
sparrow hawk
ruffed grouse
bobwhite
ring-necked pheasant
turkey
king rail
clapper rail
Virginia rail
sora rail
yellow rail
common gallinule
American coot
killdeer
golden plover
black-bellied plover
ruddy turnstone
American woodcock
common snipe
spotted sandpiper
greater yellowlegs
lesser yellowlegs
pectoral sandpiper
least sandpiper
dunlin
short-billed dowitcher
semipalmated sandpiper
western sandpiper
great-bl.-backed gull
herring gull
laughing gull

ring-billed gull
least tern
common tern
black tern
black skimmer
thick-billed murre
mourning dove
yellow-billed cuckoo
black-billed cuckoo
barn owl
great horned owl
screech owl
snowy owl
long-eared owl
short eared owl
saw-whet owl
whip-poor-will
common nighthawk
chimney swift
ruby-th. hummingbird
belted kingfisher
flicker
red-bellied woodpecker
red-headed woodpecker
yellow-bellied sapsucker
hairy woodpecker
downy woodpecker
eastern kingbird
western kingbird
great c'd flycatcher
eastern phoebe
yellow-b'd flycatcher
Acadian flycatcher
Traill's flycatcher
least flycatcher
eastern wood pewee
olive-sided flycatcher
horned lark
tree swallow
rough-winged swallow
barn swallow
purple martin
blue jay
black-billed magpie
common crow
fish crow

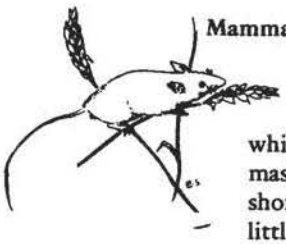
black-capped chickadee
boreal chickadee
tufted titmouse
white-br'd nuthatch
red-br'd nuthatch
brown creeper
house wren
winter wren
Carolina wren
long-billed marsh wren
short-billed marsh wren
mockingbird
catbird
brown thrasher
robin
wood thrush
hermit thrush
Swainson's thrush
gray-cheeked thrush
veery
eastern bluebird
blue-gray gnatcatcher
golden-crowned kinglet
ruby-crowned kinglet
water pipit
cedar waxwing
northern shrike
loggerhead shrike
starling
white-eyed vireo
yellow-throated vireo
solitary vireo
red-eyed vireo
Philadelphia vireo
black and white warbler
prothonotary warbler
worm-eating warbler
blue-winged warbler
Lawrence's warbler
Tennessee warbler
orange-cr. warbler
Nashville warbler
parula warbler
yellow warbler
magnolia warbler
Cape May warbler

black-throated blue warbler
myrtle warbler
black-throated green warbler
blackburnian warbler
chestnut-sided warbler
bay-breasted warbler
black-poll warbler
pine warbler
prairie warbler
palm warbler
ovenbird
northern waterthrush
Louisiana waterthrush
Kentucky warbler
Connecticut warbler
mourning warbler
yellowthroat
yellow-breasted chat
hooded warbler
Wilson's warbler
Canada warbler
American redstart
house sparrow
bobolink
eastern meadowlark
red-winged blackbird
orchard oriole
Baltimore oriole
rusty blackbird
common grackle
brown-headed cowbird
scarlet tanager
summer tanager
cardinal
rose-breasted grosbeak
indigo bunting
dickcissel
evening grosbeak
purple finch
house finch
common redpoll
pine siskin
American goldfinch
red crossbill
white-winged crossbill
rufous-sided towhee

lark bunting
Ipswich sparrow
Savannah sparrow
grasshopper sparrow
Henslow's sparrow
sharp-tailed sparrow
seaside sparrow
vesper sparrow
slate-colored junco
tree sparrow
chipping sparrow
clay-colored sparrow
field sparrow
Harris' sparrow
white crowned sparrow
white-throated sparrow
fox sparrow
Lincoln's sparrow
swamp sparrow
song sparrow
snow bunting

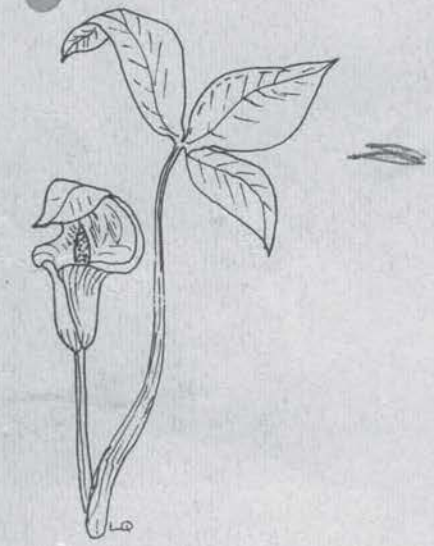


Appendix G



Mammals of the Carmans River Basin

white-tailed deer
masked shrew
short-tailed shrew
little brown myotis
keen myotis
silver-haired bat
eastern pipistrel bat
big brown bat
red bat
hoary bat
raccoon
long-tailed weasel
mink
eastern skunk
red fox
eastern mole
woodchuck
eastern chipmunk
grey squirrel
southern flying squirrel
white-footed mouse
meadow vole
pine vole
muskrat
house mouse
norway rat
meadow jumping mouse
eastern cottontail rabbit
New England cottontail rabbit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