

TOWN
OF
ARROWSIC
MAINE

*COMPREHENSIVE
PLAN*

March 1989

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COMPREHENSIVE PLAN**

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**Prepared by the
Arrowsic Comprehensive
Planning Committee**

ACKNOWLEDGMENTS

This Comprehensive Plan would not have been possible without the persistence, drive and determination of the Comprehensive Planning Committee: William Blaiklock, Arthur Dresser, Gertrude Peterson, John Wood, Ray Hutton, Karen Robbins, Mildred Stafford, Joan Richardson and Patricia Olds. The Town should appreciate the long, hard hours this group of people has put in voluntarily to make sure that this document is representative of the town. John Rollins and Jack Witham made significant contributions in the areas of geology and wildlife respectively. And thanks are also due to David Foster, Codes Enforcement Officer, and Prudence Foster, Town Clerk. Their "local knowledge" is unsurpassed and invaluable.

The Committee has tried to comply as much as possible with the Comprehensive Planning and Land Use Regulation Act (Title 30 MRSA Section 4960), passed by the Maine Legislature in 1988. Although Arrowsic does not have to comply with the law until January 1, 1993, it is the Committee's intent to continue to fine tune this document and to submit it to the state for review under that law before that time.

Finally, the Town owes thanks to Jacqueline K. Hewett, M.E.S., the Planning Consultant who kept the Committee on task. Her skill as a facilitator, her knowledge of planning and planning techniques, and her ability to analyze made her an indispensable part of the team.

Lucy Stinson, Chairman
Comprehensive Planning Committee

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HISTORY

I. INTRODUCTION

Arrowsic played an important role in the settlement and development of the lower Kennebec Valley region. Much of the town's past, spanning over 375 years since Europeans first explored the mouth of the Kennebec River, remains in obscurity. Details of everyday life and livelihood were not recorded, as the ability to read and write in those days was not critical to a man's ability to earn an honest dollar. Other information has been lost or ravaged by fire, Indian attacks, or neglect. While Bath has grown to dominate the region as a center of industry and commerce, Arrowsic has remained small and has contributed only modestly to the area since its incorporation as a town. Its history is an element of its culture, however, of which it can be proud.

The Town recognizes the value of collecting and preserving town records. In 1981, it appointed a Town Historian, a new position, in recognition of the extensive research already carried out and to initiate further research.

II. PREHISTORIC SETTLEMENT

Long before Europeans settled on the North American continent, Indians lived here. In general, they did not build permanent structures, so evidence of their presence is scarce, except as their interaction with white men was recorded. The Indians' relationship with white men ended, for the most part, with the close of the French and Indian War in 1763. The District of Maine was then free to develop unharassed.

Shellheaps, the remains of Indian settlement, do exist in Arrowsic. Shellheaps might have carried religious or cultural significance, since artifacts and human remains have sometimes been found in these deposits. In any case, many Indians ate many clams and oysters for many years to produce shellheaps. (Hartsgrove, Day)

III. EARLY EUROPEAN SETTLEMENT

Arrowsic Island was first sighted by Europeans in 1605, when Captain George Weymouth discovered the mouth of the Kennebec River and spent about a month exploring the lower river and Merrymeeting Bay. The Popham Colony was settled in 1607 at the river's mouth, but it failed due to severe climate and other hardships and was abandoned the following year. The region was ignored until 1623 when ships of the Plymouth Colony began trading with the Indians for corn and furs. In 1630, interest was renewed when Richard Hammond built a fort somewhere near Upper Hell Gate on the Sasanoa River. (Owen, Peterson)

Also in 1630, John Parker of Biddeford, England, settled near the south end of the island at what came to be called Squirrel Point. In 1649, Parker purchased Reshegon Island (Georgetown) from Chief Robinhood (also known as Chief Damaris), and moved there, retaining ownership of 100 acres at Squirrel Point. He was a fisherman and is believed to have fished from Arrowsic Island for many years before moving to Georgetown, which became known after his purchase as Parker's Island. (Owen) Fishing was a lucrative business in those days, because England needed the protein and oils desperately.

In 1649, John Richards purchased the entire island of Arrowsic (also called Rowsic and Roussack Island, among others) from Chief Robinhood, except for the 100 acres that remained in Parker's name. For several years, the island was called Richard's Island. He sold half of his interest to Thomas Clarke in 1654, and the other half to Thomas Lake in 1655, two Boston merchants who had been purchasing land on both sides of the Kennebec and Androscoggin Rivers. They purchased Parker's remaining holding within a few years. (Owen)

Clarke and Lake were industrious, aggressive entrepreneurs, and made Arrowsic Island the center for their eastern operations. Each partner alternately resided here for a year at a time. At Spring Cove, north of Palace Cove and Mill Island, they erected a fortified stockade in 1658, enclosing several large dwellings and a warehouse. It was defended with two large guns (cannon). This "main garrison" was occasionally used by local settlers for refuge from the Indians. Water-powered grist and saw mills, bake houses, smithies, copper shops, and other crafts and trades necessary for self-sufficiency were established. They also built a shipyard from which "at least a dozen or fifteen vessels" were launched. (Owen) In the 1650's and 1660's, Arrowsic was one of the largest settlements east of Boston.

One of Clarke and Lakes' most important products was lumber, which was sent to England. The Dutch wars of the 17th Century had cut off the Baltic lumber supply, forcing England to turn to her North American colonies. (Rowe) Clarke and Lake also produced cattle, grain, and fish for the local and overseas market. Reverend William Hubbard, visiting the settlement, reportedly found "a hundred thousand foot" of boards at Arrowsic. (Baker) In 1667, they delivered two massive masts to the Royal Navy, measuring 100 and 101-1/4 feet in length and 38 and 36-1/2 inches at the butt. (Rowe) The remains of this settlement, the only one on this island undergoing an organized archaeological dig, are located on the Spencer property at the site of the old John Stinson Farm.

In 1675, the outbreak of King Philip's War began nearly a century of unrest among the Indians. Although settlers in Sagadahoc had signed a peace agreement with local tribes, Hammond's fort and the entire settlement of Clark and Lake were attacked in 1676 and destroyed by the Indians. Many inhabitants were killed, including Thomas Lake, who was slain as he tried to make his escape.

The war lasted until 1677. Clarke tried to reestablish his industry, and in 1679, the royal government granted permission to resettle Arrowsic Island, establishing a township at the lower end of the island. Twenty-six men with

their families settled at New Town. They built the New Town fort in 1680, but the enterprise was doomed by the outbreak of King William's War in 1689 which raged until 1698. The whole Sagadahoc region was abandoned. (Owen)

During Queen Anne's War, from 1703 to 1713, Arrowsic still lay uninhabited. But in 1714, John Watts, whose wife was Thomas Clarke's granddaughter, organized a new group and resettled New Town. He also built a fort at Green Point, made of bricks brought from Medford, Massachusetts. It was defended with several cannon, and in 1715, a troop of 20 men was assigned to garrison the fort. (Baker) It stood until 1760.

In 1716, Samuel Bray and Jonathan Preble helped build a sawmill and a grist mill for Edward Hutchinson and John Watts. They completed the mills, although a dam was still needed to operate them. (Owen) Presumably a dam was built sometime thereafter. These tidal mills were developed as double mills: the tide powered one side of the mill on the flow and the other side of the mill on the ebb. Tidal creeks were often dammed to create a pond for storing logs.

In 1716, the town was officially incorporated as Georgetown on Arrowsic Island. In 1717, however, the Hanovers came to the throne in England, and the loyal subjects of Georgetown renamed the island Hanover Island. This name did not stick, but it was used on deeds from 1717 to 1721. (Owen, Baker)

In 1717, a council was held at Fiddlers Reach between the royal government and the Indian sagamores. Over 200 Indians attended. Governor Samuel Shute of Massachusetts and several government representatives were brought here on board the H.M.S. Squirrel, which grounded at Squirrel Point on its way to the council. The ship was refloated unharmed on the incoming tide, but the point retained the name of the ship. (Baker)

By 1718, Georgetown on Arrowsic had 40 dwellings, of which 5 were garrisons, and the residents owned many cattle. In 1719, Samuel Denny and William Robinson built a wind-powered grist mill, to which "People were said to have traveled great distances to have their grain ground." (Baker)

In 1720, the people of Georgetown built Fort Menaskoux (also called Arrowsic Fort and Georgetown Fort) on the south side of Fisher Eddy. Captain Samuel Penhallow was in command. Even this fort was unable to defend the Georgetown residents from Indian attacks, for when Lovewell's War erupted in 1722, over 400 Indians attacked, killing one man, 56 cattle, and burning 26 homes. The war ended in 1724; a peace treaty was signed in 1726; and Georgetown was resettled in 1728, its residents returning to the 20 remaining dwellings, including Watts Garrison. (Baker) At that time, Samuel Denny built a blockhouse at New Town to supplement the village's defenses. (Peterson)

IV. PERMANENT SETTLEMENT

Georgetown was left at peace to grow and prosper. The island was rich in resources, and the Caribbean and Europe were ready markets for the island's wealth. Georgetown exported pipe (barrel) staves, boards, shingles, and ship

timbers. (Rowe) In 1736, Benjamin Pattee, a shipwright from Gloucester, purchased land here, and perhaps continued his trade here. (Baker)

About 1740, the fort at Richmond was rebuilt. "During the rebuilding, which took about two years, bricks for the fireplaces and chimneys were sent up from Arrowsic." (Baker) We do not know if this means that bricks were made in Arrowsic, or if Arrowsic served only as a distribution center for bricks imported from elsewhere.

Samuel Denny was authorized to call the first Town Meeting in Arrowsic in 1738, making the island the seat of government for the whole Sagadahoc region, a position the community held for many years. (Baker) Town Meetings were held in Denny's home until 1742, when a meeting house was built at Pleasant Cove.

In 1741, York County licensed John Carlton to keep the ferry between Arrowsic and Woolwich near Upper Hell Gate. Apparently, the ferry had been in existence before that year. Carlton's son Jonathan was licensed 19 years later by Lincoln County. (Baker)

In 1745, a plan to capture Louisbourg, the French fortress in Nova Scotia, was plotted. Lt. Col. Arthur Noble of Georgetown, of the 2nd Massachusetts Regiment, was on the military staff of the expedition, and two or three Georgetown vessels served as transports for the soldiers. The expedition proved successful, but Noble was killed two years later in action at Minas, Nova Scotia. (Baker)

Recorded shipbuilding in Arrowsic began in 1753, when The Jolly Phillip, a 45-ton schooner, was built. Ship registers in the customs district required the registration of trade vessels only; undoubtedly a goodly number of fishing vessels came off the ways in Arrowsic, too. Twenty-two registered ships were built in Arrowsic from 1753 until 1902, among them schooners, sloops, and brigs, ranging from 13 to 258 tons and from 41 feet to 108 feet in length. (Baker)

In 1756, a Mr. Preble built a blockhouse at Preble Point. This was the year after the outbreak of the French and Indian War. The blockhouse did little to protect the Preble family two years later, in 1758, when Indians killed or captured the Prebles in the last Indian massacre to take place on Arrowsic Island. (Owen)

In 1760, the French and Indian War came to an end, with England ousting France from Canada. This ended the struggle for power in North America, and the Indians no longer waged war on the English settlers.

It was in this year that Cumberland and Lincoln Counties were established and set off from York County. Georgetown became a part of Lincoln County. (Owen)

In 1763, the first meeting house and a church were built at New Town.

Peace was short-lived. By 1763, noticeable dissatisfaction with the mother country grew among the colonies. The town sympathized strongly with its

compatriots in the Massachusetts Bay Colony. The Revolution was on the way, although it was more than 10 years before war actually broke out.

In 1767, James Sullivan, a lawyer, moved into Georgetown and set up his office in Samuel Denny's blockhouse. He practiced here for two years. He later became the Governor of Massachusetts, and was Maine's first historian, writing his history in 1795. (Baker)

V. THE REVOLUTION

In 1773, Georgetown received a letter from Boston detailing a "tea party" in Boston Harbor, and asking for support and cooperation. In response, the town wrote back, expressing their empathy with the Bostonians' situation and their plan to join with Boston in adopting such measures as would protect their rights and privileges. The following year, the town's committee assessed their stock of ammunition, exhibiting their awareness of the gravity of the situation. (Owen)

Early in 1775, an enlistment paper was drawn up, establishing a body of minutemen in the town. Within weeks, fighting erupted at Lexington and Concord, and Georgetown responded to the "Lexington Alarm." Samuel McCobb, town clerk of Georgetown, led a group of men to Boston, and a company was established there with McCobb as its captain. They fought in Nixon's Regiment under the command of Colonel Prescott ("Don't fire until you see the white of their eyes!") at Bunker Hill. Some question has been raised as to how many men McCobb had under him. In the days of the Revolution, a company consisted of 70 men, but that early in the fighting, companies were probably incomplete. By fall, McCobb had close to his quota, and they were assigned to go with Benedict Arnold up the Kennebec River to capture Quebec by the "back door". (Massachusetts Archives)

Half-way to Quebec, without food or shelter and plagued by severe weather, the expedition got separated. McCobb's superiors felt that to continue was sure death, so his division returned to Cambridge late in October. (Owen, Wallace)

McCobb was made a colonel in 1776, and put in command of the Lincoln County Regiment. His brother James became a captain in this regiment. They fought in Rhode Island that year. In 1777, James Pattee of Arrowsic formed a company of artillery which was assigned to the regiment. The regiment was assigned to guard the eastern coast, keeping watch at the mouth of the Kennebec lest the British gain a foothold there. About one-fifth of the regiment at any time was stationed with the Continental Army in active duty, as part of the Massachusetts line regiments. (Massachusetts Archives)

Soldiers on watch at the mouth of the Kennebec drove away a Tory schooner in 1778, and the following year, a large contingent of the regiment saw action in the ill-fated Penobscot Expedition at Castine. The regiment saw further action at Castine in 1781. About this time, McCobb was promoted to Brigadier-General, in command of the entire eastern department, and carried this rank until his death. He is buried in the New Town Cemetery near the end of Bald Head Road. (Owen, Williamson)

VI. INDUSTRY OF THE 19th CENTURY

By 1783, most open hostilities between England and the new United States had ceased and a treaty was signed at Paris. Normal life could now resume.

Business and industry grew unfettered. In the mid-1780's, the China trade opened up, and Americans no longer had to rely on the Dutch and English East India Companies for teas and silks. Shipbuilding was given an important boost in 1789 when the new federal government adopted a policy of protection for its infant merchant marine. Hard money, scarce between the end of the Revolution and 1789, was coined, and this provided dependable specie on which to base loans for shipbuilding. (Rowe)

For about 20 years during this period, Charles Vaughan of Hallowell tried to establish Arrowsic as a major port to avoid the diversion of most of the foreign trade in the Kennebec Valley to Wiscasset. He chose Jones' Eddy, named after a colorful Tory loyalist who harassed the Kennebec region during the Revolution. Unfortunately, about the turn of the century, shipmasters discovered that they could sail safely up to Long Reach (now Bath). Prior to 1800, Arrowsic was the natural place to develop trade and commerce because navigating around Bluff Head into the narrow reach upstream proved too formidable for most captains. As the upper river was charted, opening navigation above Bluff head, Bath became the business center for the whole Kennebec Valley, and Arrowsic was ignored. (Baker) Shipbuilding, rather than river-borne commerce, was the future of the eastern frontier. Once Long Reach was discovered, Arrowsic was considered to be on the wrong side of the river to develop significant deepwater ports.

In 1795, the first town road in Arrowsic was laid from Butler's Shipyard Landing (at the site of a then-thriving shipyard) at the south end of the island, up today's Bald Head Road, Steen Road, Old Stage Road, and the north part of Route 127, ending at the ferry at Preble Point. (Town Records) The bridge across Back River to Parker's Island (Georgetown) may have been in existence as early as 1803, when a road was laid out by the town that crossed this bridge. The Back River Bridge was originally located at Indian Rest, where the land is not as steep. (Town Records)

About 1802, Bath ships entered the cotton-carrying trade, nearly monopolizing it for 80 years. By the 1820's, cotton production in the South had more than doubled, and by the 1830's, four-fifths of the crop was exported to Europe, most carried in vessels produced by Kennebec River shipyards. (Rowe)

From 1815 to about 1840, the sawmills of the region provided both planking for vessels under construction and lumber for cargo. During this period, two sawmills operated at Spinney Creek and at Mill Island. (Baker).

By 1820, the fishing pinky, a fore-and-aft rigged, double-ended schooner, was developed and perfected. Popular up and down the coast, it handled extremely well under any weather conditions. Weighing from 20 to 80 tons, the pinky cost a fisherman between \$800 and \$1500 to outfit. (Rowe)

In 1820, Maine ran into hard times. In that year it became a state, and the transition to a new government rocked the coastal communities. In addition, the demand for large ships slumped, since the West India trade was terminated. (England had closed these ports to American merchants in 1783 at the end of the Revolution.) The state added a burden by taxing its industries heavily. In the mid-1820's, England reopened the West Indies, stimulating new trade and a rash of shipbuilding. "Over-optimism and unwarranted credit brought their inevitable result. In 1837, the banks suspended specie payments and the panic was on." (Rowe) Though the nation took five years to recover, New England banks resumed specie payments in 1840, and shipbuilding on the Kennebec reached new highs in the 1840's. (Rowe)

VII. ARROWSIC BECOMES A TOWN

In 1841, Arrowsic Island separated from Georgetown and was officially incorporated as the Town of Arrowsic.

It was during this period, the 1840's, that shipbuilding reached its climax in town. Ten ships in all were built between 1842 and 1849, eight of them schooners, one a brig, and one a boat. One of the schooners, built in 1847, was named Arrowsic by her owner, William Potter. She was said to be a very good sailer and worked until 1860, when she was caught in a squall off Block Island carrying too much sail, and was lost. (Baker)

The 1850's saw more vessels built in Arrowsic, three schooners and four brigs, most of them built by Elwell P. Swett. (Baker)

In 1849, the first bridge from Arrowsic to Woolwich was built at Preble Point, replacing the ferry. This was a low drawbridge, the remains of which are still visible at low tide. This bridge exacted a toll from both those crossing on it and those passing under it: the bridgekeepers passed down a canvas bag on a long pole into which people on the vessels dropped their tolls. (Baker) When the bridge was built, the town requested that the County build a new road leading to the bridge. In 1888, the town voted to let the driver of the stage coach cross over the bridge for half-fare if he passed every day. (Town Records)

Other ferries that operated on Arrowsic Island at one time or another included Tibbetts Ferry, which crossed the Sasanoa River near Upper Hell Gate, since before 1741, when John Carlton was licensed to keep it. Another operated by Joseph and Charles Couilliard began as early as 1809 and was still in operation at least until 1835, when the town laid out and accepted a road from the ferry to the main road. This may have been the ferry that ran from Bluff Head across to Phippsburg, or from a point west of Preble Point across to Bath. This second ferry location was in use in 1795. (Town Records)

At least as early as 1850, the building now used as the Town Hall was built. Privately owned, it was a "Band Hall". The town used it occasionally for town meetings from 1852 until 1880. Town meetings were also held in the North or South Schoolhouse, or in the hall over C. C. Crosby's store on Mill Island. For years, the townspeople had discussed the need for a meeting house, but it wasn't until 1878 that they authorized the Selectmen "to negotiate with the

owners of the Band Hall and have it transferred to the Town...." (Town Historian) The Selectmen bought the building from Nicolas L. Hogan and Thomas J. Rairden for \$21, and in 1879, with an appropriation of \$100, the town moved the Band Hall a quarter of a mile to a site next to the Methodist Church on Old Stage Road (now a private residence) and had it repaired. The move reportedly took "42 yoke of oxen and much cider drinking and loud talk". The town held its first annual town meeting in its own Town Hall in 1880. In 1949, the Town Hall was moved again, with trucks, to its present site, on the same lot as the North Schoolhouse, which was razed in the late 1960's. (Town Historian)

Wooden shipbuilding peaked in the Bath region in the 1850's. This period also saw the advent of steampower, and in 1853, the steamboat Teazer, which ran between Augusta and Boothbay, advertised a change in its route because it had great difficulty in navigating the Arrowsic drawbridge. (Baker)

The 1850's saw much roadbuilding in Arrowsic. The County Road, now Route 127, was laid out in the fall of 1850, and the town voted to expend \$300 in 1853 for its completion. (Town Records)

Financial panic and disaster struck the nation in 1857. Many shipyards closed and never reopened. A small schooner, the J. F. Dutton, was built in Arrowsic that year, but thereafter only three vessels were built in the town, one each in the years 1875, 1880, and 1902. (Baker) The Civil War caused shipbuilding everywhere to slump. Bath area merchants, looking for other means of income, started the ice trade. This industry caught on rapidly, and at one time over 244 ice plants, often using old shipyards, operated on the banks of the Kennebec. This industry dominated the Kennebec until 1900, when Hudson River entrepreneurs finally built their own ice companies. These companies and the advent of refrigeration killed Maine's ice industry within ten years. Until that time, however, ice was king on the Kennebec. Between 1870 and 1890, the annual ice cut only twice dipped below one million tons. In 1880, 1.5 million tons of ice were cut, and in 1890, 3 million tons were cut, a harvest requiring 25,000 men and 1,000 horses. (Rowe)

In Arrowsic, Sewall Pond provided ice for many years, the ice being transported down the outlet stream to Spinney Mill. In the town records are several references to the ice sluice. Apparently the ice cutters requested permission of the town to built a sluice-way across the main road. Ice was transported across the road on this sluice, then pushed or pulled, probably with horses or oxen, to the edge of the Kennebec River, where it was stored, packed in sawdust, until the summer when the demand was high.

Mining was another industry which residents tried. In 1864, the Bath Iron Mining and Manufacturing Company bought the mining rights to Arrowsic Island. Arrowsic did not prove to be a propitious place for iron mining, though two old iron mines are known on the island. The mining company, however, did mine emery from Arrowsic, milling it into emery stones for cutting and tool sharpening. (Owen) One of these mines ran into a spring, which ended that endeavor, as the mine filled with water. Shrewd businessmen made the best of

a bad situation, however, and sold spring water. (Steen) A feldspar mine was quarried somewhere down near Bald Head by the Verona Mining Company, about the year 1910. (Sagadahoc Cty. Reg. Deeds)

Shipbuilding experienced a brief resurgence in the 1870's, when California wheat came into high demand. The climatic conditions of the West Coast produced a wheat so dry and hard that it kept in prime condition during the 14,000-mile journey around Cape Horn. The square-rigged "downeaster" was built just for this trade. By the middle of the 1880's, however, too much foreign competition hurt this trade and it lost its importance. (Rowe) Wooden shipbuilding was finished by the 1890's, except for a brief flurry of activity during World War I.

By 1890, steamboats had become the popular means of transportation. They were built with shallow drafts to accommodate the Kennebec River, which by this time was filled with sawdust. The Kennebec was built in 1889, a steamer for the Boston-to-Kennebec route. The Bath Iron Works made her boiler, the largest built in Maine at that time, and her frame of oak was cut in Arrowsic. (Baker) Sea-going barges, with immense cargo capacity, were developed about this time and dominated the industry at Bath yards. They were towed by stream-operated vessels. (Rowe)

In 1896, the federal government recognized the necessity of navigational aids in the Kennebec River, and built Doubling Point Light Station, Doubling Point Range Lights and Squirrel Point Light Station. The lights were installed in 1898. Fog still presented a problem, however, and in 1912, the steamer Ramson B. Fuller, ran aground in a thick fog and was laid up in Fiddlers Reach for several hours until the tide floated her, with minimal damage. A petition was sent to Washington requesting the establishment of a fog-signal bell. In 1914, the tower was built and a clock machinery to operate the fog bell was installed. (Sterling)

VIII. THE 20th CENTURY

The advent of the 20th Century has seen Arrowsic's small industry decline and disappear. The town's population in 1900 stood at 180 persons and had been declining since the Civil War and the advent of the Industrial Revolution. Arrowsic had little to offer its young people for jobs, and they moved to the cities, seeking financial security and opportunity. Also, World War I showed the young people the world, and many never returned to their homes on this small coastal island. The population reached a low in 1930 at the beginning of the Great Depression, a mere 135 persons, but grew somewhat during those hard years. People probably found it easier to live in the country where they could at least grow food for the table.

The Carlton Bridge from Bath to Woolwich, built in 1927, made Bath easily accessible and the town became dependent on the city for employment, food, clothing, and other commodities. The development of major inland highways isolated this community to some degree. There was no longer an economic need or justification to compete with Bath.

Between 1970 and 1980 the U.S. Census showed a rise in population in Arrowsic of 62 percent as more and more people found the little "bedroom community" a good place in which to live and raise their families.

Since then the population of Arrowsic has increased at an unprecedented rate....from 305 in 1980 to 458 in 1987. The reasons behind this rapid growth have been mainly the thriving economy of the Bath Iron Works and the availability of land on which to build. The Bath Iron Works has been enjoying a very prosperous decade and its prosperity has spread to all other types of businesses along the coast. Owners of large lots of farm land who have found taxes more than what they could comfortably pay have sold these lands. Often it was the developer who bought and subdivided, making small lots available to the homebuilder.

IX. HISTORICAL SITES

Some items not mentioned in the course of this brief history deserve recognition. One of these is the number of cemeteries on the island. Twenty-six burial grounds have been discovered, some quite large, others with but a single stone, some with no stones at all. Families usually had their own burial plot. Those that are known are marked on the Historical Sites map at the Town Hall. The old family names dominant in these plots include, but are not limited to: Stinson, McKenney, Preble, Snipe, Whitmore, Erskine, Reardon, Fisher, Couilliard, Heal, Pattee, and Lawrence.

Many residents of the 18th and 19th centuries were fishermen as well as farmers. Old residents on the island recall the days when nearly every family had a boat and operated a herring weir. No weirs stand today, but they were located between Squirrel Point and Bald Head, out on Crow Island, in the Back River at several locations, in Palace Cove, in Fisher Eddy, and in the Sasanoa River.

Part of farming included getting in hay. The island's extensive marshlands provided valuable salt hay. The marshes were often drained to provide a firm footing for men and oxen or horses to cut and gather the hay. This was done particularly early in Arrowsic's history, before the island was cleared to grow hay.

Because of the extensive marshlands, dikes often had to be built to allow roads to cross the marshes. These were made of earth or stone. A stone dike was built at Jones' Marsh and another at Preble's Marsh, both of which required repair work in 1865, 1866, 1885, 1890, 1893, 1894, and 1895. (Town Records)

On the site of the 17th Century Clarke and Lake establishment on the Sasanoa River, on the land presently owned by Mr. and Mrs. W. W. Spencer, there has been an archaeological dig over the last several years. Emerson W. Baker, in his book, The Clarke and Lake Company: The Historical Archaeology of the Seventeenth Century Maine Settlement, published by the Maine Historic Preservation Commission in 1985 sums up the findings of what has been unearthed. The artifacts discovered at this dig show the diversity of the life styles of the early Arrowsic people who were trappers, fishermen, farmers,

lumbermen, tradesmen, merchants, shipbuilders, blacksmiths, coopers, bakers, etc., a very self-sufficient community who traded with the native Indians, local English colonists to the south, French colonists to the north and east, European ports and the West Indies countries.

Other historical sites have been mapped on the "Historical Sites" map, kept at the Town Hall.

X. ROWSIC PARK Arrowsic's First Subdivision

In 1901 Samuel L. Beals of Arrowsic sold to Nathan D. Chapman of Boston, Massachusetts his farm on the Bald Head Road. The 70-acre farm was bounded on the west by the Kennebec River, on the east by the Back River Creek and the marshland of Henry White, on the north by the Pattee Place, and on the south by the land of Charles V. Minot (Heal Homestead). The north and south bounds of the farm are marked by stonewalls. Beals reserved and excepted from the sale the highway running north and south through the farm and also the lots of the burial place with the right of way to the same (Newtown Cemetery).

In June of 1901 Charles A. Corliss, Civil Engineer, divided the farm into three Plans consisting of more than 600 tiny lots in all, with streets running east and west and with common recreational areas. On the west side of the town road the lots were 50' x 100', and on the east 40' x 80'.

Mr. Chapman sold off many individual lots to persons in Boston, Everett, Malden, Roxbury, Salem, Milton, and other towns in Massachusetts. He also sold groups of lots to persons who formed trusts and real estate companies, such as Augusta Trustees, Hub Associates, and Commonwealth Real Estate and Trust Company.

(In 1912 the Commonwealth Real Estate and Trust Company, when applying for a \$55,000 mortgage, listed among its holdings, parks in Lowell, Malden, and Brockton, Massachusetts; Manchester, New Hampshire; Portland, Sebago, Sanford, Deer Isle, Auburn and Arrowsic, Maine; as well as 3000 shares of Brockton Pink Granite Quarry Company.)

As early as 1906 (when they realized what they had bought) some of the lot owners were delinquent in paying their taxes and by 1910 the Town of Arrowsic took those lots for nonpayment of taxes. In 1912, 35 more persons lost 40 lots for the same reason. In 1914, 58 more lots were taken; in 1917, 26; 35 in 1919, and so on, until the mid-1930's the Town owned nearly all of the farm formerly owned by Samuel L. Beals.

This property sat idle, visited only by a few hikers, hunters, and berrypickers until 1965 when the Town of Arrowsic sold all of the lots of Rowsic Park (except 3 tiny lots) to Thomas Kahrl of Essex, Massachusetts for the sum of \$6,000.

It was agreed that \$2,000 of this was to be used to upgrade the Bald Head Road to a passable condition. The rest of the money from the sale went into the Tarring Account.

(From Sagadahoc County Register of Deeds, Arrowsic Town Records, and Town Historian.)

BACKGROUND DATA

POPULATION

The Town of Arrowsic has experienced rapid population growth since 1970, increasing from 188 persons in 1970 to 305 in 1980 to 458 in 1987, a 144% increase over the past 17 years. (Table 1) When compared with State population estimates for 1987 for surrounding communities, this growth is substantially above the regional average. However, the actual growth rates for surrounding communities may be slightly higher than is shown in Table 2. When these estimates were compared with actual population counts in Arrowsic for 1987, the State figures were significantly low. As a result, the figures in Table 2 for Arrowsic were altered to represent true population values as calculated from local knowledge and data.

TABLE 1

Arrowsic Population Growth Past and Projected

<u>Year</u>	<u>Percent Change</u>
1970-1980	62%
1980-1987	50%
1987-1992	26%
1992-1997	20%

Source: U.S. Census and GPCOG projections.

TABLE 2

Arrowsic and Regional Population Trends

<u>Towns</u>	<u>1980</u>	<u>1987</u>	<u>% Change 1980-'87</u>	<u>1992</u>	<u>% Change 1987-'92</u>
Arrowsic	305	458	50	577	26
Bath	10,246	10,150	-.9	10,000	-1.5
Georgetown	735	790	7.5	850	7.6
Woolwich	2,156	2,350	9	2,500	6.4
W. Bath	1,309	1,500	14.6	1,600	6.7
Phippsburg	1,527	1,700	11.3	1,800	5.9

Source: Arrowsic data - Town records and GPCOG projections
All other Towns - State Planning Office

The age distribution of Arrowsic's population remained relatively stable between 1980 and 1987. In 1980, children (ages 0-17) made up approximately 24% of the Town's total population. By 1987 this figure had increased to 26% which represents an increase of 45 children. During this same period of time, the percentage of residents 65 and older declined from 8.8% in 1980 to 7% in 1987. It is projected that these trends will reverse themselves in the coming years (see Table 3) with children making up a smaller percentage of total population and the elderly making up a larger share.

TABLE 3

Arrowsic Population and Projections by Age Cohort

	1980	1987	1992	1997
0-4	15	42	42	45
5-17	60	78	99	115
18-44	136	225	277	318
45-64	67	80	115	161
65+	27	32	44	55
Total	305	458	577	694

Source: 1980 - U.S. Census
1987-1997 - GPCOG Data Service

Between 1980 and 1987 the natural population increase in Arrowsic accounted for only 9.8% of the town's total growth. During this period 36 births were recorded in town while 21 people died. These figures yield a natural increase in town of 15 people. By contrast, total population growth in Arrowsic during the period 1980-1987 was 153 individuals. This results in an immigration figure of 138 people or 90.2% of town growth.

Population density in Arrowsic has increased 50% since 1980. In 1980 there were 34.46 people per square mile in Arrowsic. By 1987 this figure had increased to 51.75 (Table 4). When compared to surrounding communities this density is still quite low. Only Georgetown with an area more than twice as large as Arrowsic has a population density lower than Arrowsic.

TABLE 4

Arrowsic and Regional
Population Density

	1987 est. Population	Square Miles	Density (# people/sq.mile)
Arrowsic	458	8.85	51.75
Bath	10,150	9.84	1031.5
Georgetown	790	18.5	42.7
Woolwich	2,350	37.60	62.5
W. Bath	1,500	12.33	121.65
Phippsburg	1,700	30.96	54.9

Population projections for Arrowsic were prepared for this report by the Greater Portland Council of Governments Data Service utilizing town data generated from town records and local knowledge. The methodology used by the Data Service incorporated birth and death data, housing start information and an estimate of household size, housing vacancy and migration rates. This methodology has projected a 26% population increase in Arrowsic between 1987 and 1992 and a 20% increase between 1992 and 1997. These figures translate to an annual rate of increase of 4.7% between 1987 and 1992 and a 3.8% rate between 1992 and 1997. (Table 5)

TABLE 5

Arrowsic Population Projection

Age Cohort	Total Pop. 1987	Total Pop. 1992	Total Pop. 1997	Total 87-97 Increase	Ann. Rate 87-97	Ann. Rate 87-92	Ann. Rate 92-97
0-4	42	42	45	8.3%	0.8%	0.1%	1.5%
5-17	78	99	115	46.1%	3.9%	4.7%	3.1%
18-44	225	277	318	41.1%	3.5%	4.2%	2.8%
45-64	80	115	161	101.9%	7.3%	7.6%	6.9%
65+	32	44	55	69.3%	5.4%	6.3%	4.6%
TOTAL	458	577	694	51.6%	4.2%	4.7%	3.8%

During the summer of 1988 a local survey was conducted in Arrowsic to help the Comprehensive Planning Committee identify local issues of concern to town residents. As part of this questionnaire, residents were asked what level of population they felt the town could grow to by 1998 and still be a place where they would choose to live. Of the 56 respondents to this question, 27% felt the town should stay essentially the same size while the remaining 73% felt that some growth was appropriate. The most frequently cited range for future population size was 750 to 800 people by 1998. However, 36% of the respondents felt that a range of 500-750 was optimum. The current population projection for the year 1997 is 694.

HOUSING

According to the U.S. Census, there were 145 housing units in Arrowsic in 1980. By 1988 this number had increased to 217, a 50% growth in eight years. Of these 217 units, 187 (86%) are year-round dwellings, 23 (11%) are seasonal units, and 7 (3%) are currently unoccupied. There are 25 mobile or modular homes in Arrowsic which represent approximately 11.5% of Arrowsic's housing stock. Arrowsic has no multi-family dwellings. Eight units are currently being rented.

The average household size in Arrowsic is 2.68 as calculated by town officials in September of 1988, using personal knowledge and town records. In 1980 the Census estimated this figure at 2.65 for the town and 2.8 for Sagadahoc County.

TABLE 6

	Conventional Single Units	Mobile Home Units	Total Year-round Units (occupied & unoccupied)	Seasonal Units	Total Units
1970	---	---	62	17	79
1980	97	18	115	30	145
1988	143	25	194	23	217

The best available vacancy rate for housing in Arrowsic is that which was recently calculated by town officials for this report. It found that 4% of year-round housing units were vacant. However, this number does not reflect housing units which may be vacant because of substandard condition. Therefore, this rate may actually be lower than calculated. There are no current county or state vacancy rates to compare to this 1988 figure; however, based on 1980 figures of 6% for Sagadahoc County, Arrowsic's present rate is quite low.

There have been nine new seasonal dwellings constructed since 1970. Although there has been an increase in the number of seasonal dwellings, their total quantity compared to year-round dwellings has dropped from 26% to 22% since 1980. Most newly constructed seasonal homes are of a quality suitable for year-round use.

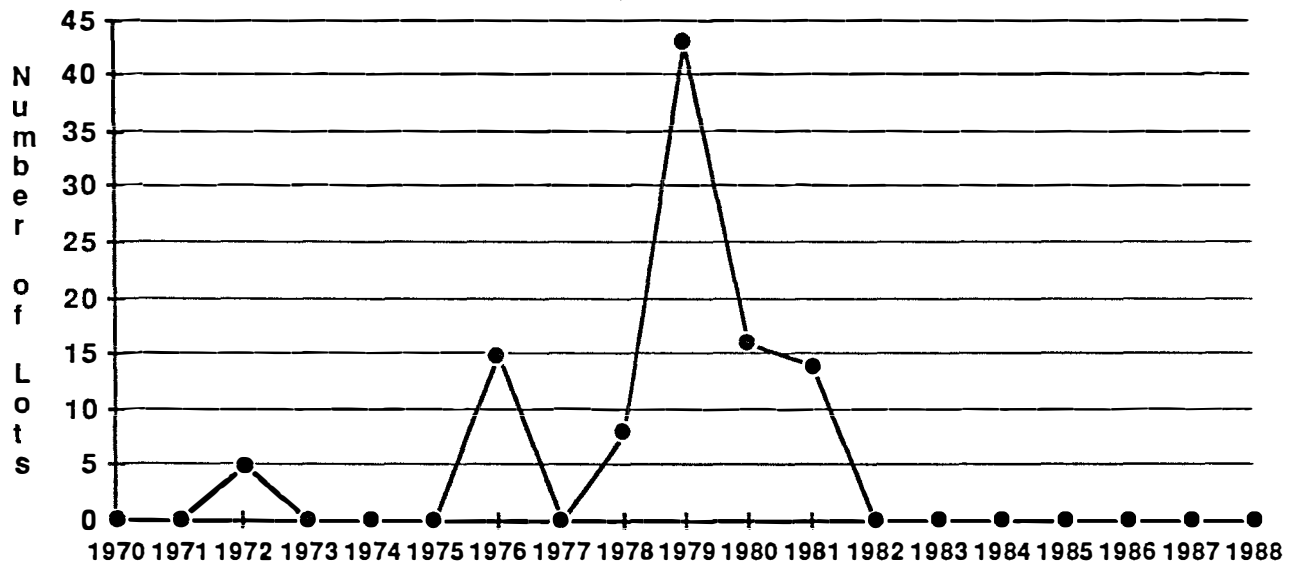
Substandard housing in Arrowsic (those units which lack adequate plumbing) has decreased from nine to seven units since 1980.

Although there have been no new subdivisions approved in Arrowsic since 1981, building activity on previously approved lots has been substantial. (See Exhibit 1) Of the 70 lots available to build upon in 1981, 41 have seen the construction of a house while 29 are still undeveloped, a 60% reduction in the past seven years.

The rate of housing construction has been significantly impacted by subdivisions. The average construction rate from 1970 to 1980 was 5.3 year-round dwellings per year. From 1980 to 1988 the average rate was 7.9 dwellings, an increase of 50%. During

EXHIBIT 1

NUMBER OF ANNUAL SUBDIVISION LOTS APPROVED
1970 - 1988



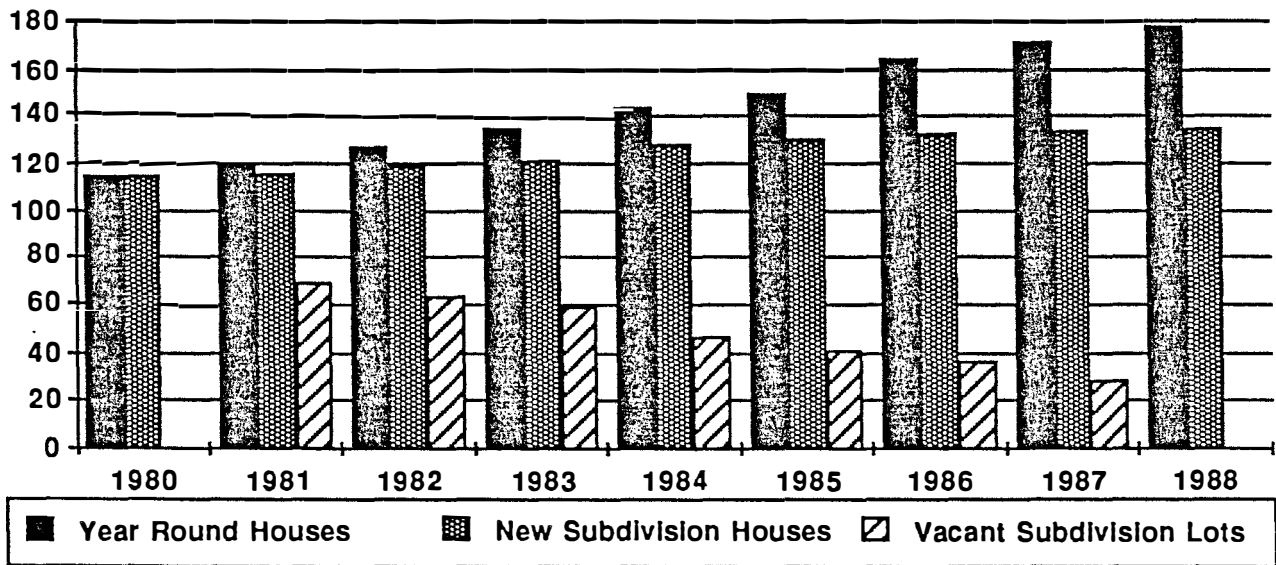
the last eight years 68% of all dwelling construction has been in subdivisions. (See Exhibit 2)

Based on local assessed values which have been adjusted to reflect 1987-1988 market values, the average cost of a single-family home in Arrowsic is presently about \$132,366. The estimated median market value of housing in Arrowsic is \$107,265. The Maine State Housing Authority defines an affordable house as one which costs about 2 1/2 times gross yearly household income or which requires an expenditure of not more than 28% of gross yearly income for principal, interest, taxes and insurance. In Arrowsic, median household income for 1987 was estimated at \$28,200. Low income was estimated at about \$22,560 (80% of median). Assuming these income values are approximately correct, an affordable house for low and moderate income people in Arrowsic would cost between \$62,666 and \$78,333 if 10% of the cost of the house were paid as a down payment and a mortgage rate of 10.5% for 30 years was obtained. If taxes, insurance and mortgage insurance were excepted from the monthly payment, these figures would be slightly less.

There are 60 houses in Arrowsic which presently have an estimated market value which would be affordable for a low or moderate income person wishing to live in town. This figure represents 31% of Arrowsic's total year-round housing stock of 194 units.

EXHIBIT 2

Municipal Land Development
1980 - 1988



ECONOMIC CONDITIONS

Arrowsic's economic base is dependent on outside forces since the majority of Arrowsic's residents work outside of the town to make their living. With the exception of home businesses, there is no commercial or industrial activity in Arrowsic. Most residents work in the employment centers of Bath and Brunswick and commute to these centers daily. The economic health of these regional employment centers is, therefore, critical to the economic well-being of Arrowsic.

Sectors of the Economy

30% of Arrowsic's work force works in manufacturing. This fact reflects the large number of Arrowsic's residents who are employed by Bath Iron Works in Bath. 34% work in some service-oriented business or profession such as teaching and 15% work in construction.

TABLE 7

Employment in Arrowsic
by Economic Sector
1988

<u>Sector</u>	<u># Employed</u>	<u>% of Total Employment</u>
Construction	25	15.0%
Manufacturing	50	30.0%
Transportation	2	1.2%
Wholesale Trade	2	1.2%
Retail Trade	11	6.6%
Finance	2	1.2%
Service		
Professional	4	2.4%
Government	13	7.8%
Other	57	34.0%

Source: Local information

Of these three categories, the percentage of construction employment is the most reflective of changes in Arrowsic's economy in recent years. Between 1980 and 1988 the number of residents listing their place of work as Arrowsic has more than doubled. The majority of these individuals work as independent construction contractors and base their work from their homes. This growth in the construction trades is indicative of Maine's significant economic growth since 1982.

TABLE 8

Place of Work of Arrowsic Residents
1980 and 1988

Place of Work	1980		1988	
	Number	%	Number	%
Woolwich	12	10.4%	--	--
W. Bath	6	5.2%	--	--
Arrowsic	13	11.3%	34	21%
Bath	68	59.0%	82	50%
Remainder of Sag. County	10	8.7%	1	0.6%
Brunswick	18	15.6%	13	7.9%
West of Brunswick			15	9.0%
Wiscasset	--	--	6	3.6%
Remainder of Lincoln County	--	--	4	2.4%
Elsewhere	3	2.6%	9	5.4%
Not Reported	2	1.7%	1	0.6%

Source: Local Information

Employment

Arrowsic's labor force grew 21% between 1980 and 1987, while the unemployment rate dropped from 5.34 to .60. The unemployment rate in Arrowsic has been lower than the County average throughout this seven-year period and preliminary counts for 1988 show a further reduction in this rate.

These employment figures are indicators of Maine's growing economy over the past 5-6 years and more significantly for Arrowsic of the continual expansion of Bath Iron Works.

TABLE 9

Arrowsic Annual Labor Force
and Employment Rate
1980-1987

Year	People in Labor Force	People Employed	Unemployment Rate
1980	131	124	5.34
1981	134	129	3.73
1982	140	136	2.85
1983	145	142	2.06
1984	144	142	1.38
1985	145	144	.68
1986	152	151	.65
1987	165	164	.60

Source: Bureau of Employment Security, Maine Department of Labor

Income

Per capita and median household income are indicators of economic health in a community and, when compared with County and State data, the general economic well-being of a town's residents in comparison to other towns.

TABLE 10

Per Capita Income for
Arrowsic, Sagadahoc County
and the State of Maine
1979-1985

	<u>1979</u>	<u>1983</u>	<u>1985</u>
Arrowsic	6606	9594	10,697
Sagadahoc County	5924	8267	9,239
State of Maine	5766	7830	9,063

Source: Bureau of the Census

Arrowsic's per capita income in 1979, 1983 and 1985 was higher than County and State figures and its rate of growth has exceeded both County the and the State. Between 1979 and 1985, Arrowsic's per capita income grew 38% while County and State income grew only 36%.

Assuming that median household income grew at the same rate as per capita income between 1979 and 1987, median household income in Arrowsic in 1987 was \$28,200 or 2.5% above the estimated county figure.

TABLE 11

Median Household Income
Arrowsic and Sagadahoc County
1979¹ and 1987²

	<u>1979</u>	<u>1987</u>
Arrowsic	14,688	28,200
Sagadahoc County	14,855	27,481

1. Source: U.S. Census
2. Source: Data estimated by local officials utilizing Federal per capita data for Arrowsic and Sagadahoc County.

These income figures illustrate several facts about Arrowsic. First, the average incomes for the majority of Arrowsic's residents are above county and State figures. This may be reflective of the high number of residents who work at Bath Iron Works and receive generally good manufacturing wages for skilled labor and the large number of self-employed construction contractors who typically have above average incomes. Second, because of Arrowsic's scenic character and beauty, it has traditionally been a lure for affluent, retired people who wish to reside near the shore but within a short driving distance to shopping and cultural centers. These individuals typically have above-average incomes.

MUNICIPAL SERVICES AND FACILITIES

Municipal Government, Administration and Taxes

Arrowsic has a Town Meeting form of government. Three residents are elected in staggered terms to the Board of Selectmen, who also serve as surveyors of wood, lumber and bark; assessors; overseers of the poor; and fenceviewers. Other elected officials are the treasurer, tax collector, town clerk, fire chief, and three-member school committee. All elected officials are paid token salaries.

Appointed officials are a five-member planning board, registrar of votes and election warden, four election clerks, codes enforcement officer, five-member road commission, five-member zoning board of appeals, state fire warden, assistant fire chief, director of civil emergency preparedness, health officer, town historian, and seven-member conservation commission. The registrar of voters, election clerks, codes enforcement officer, animal control officer, fire chief, assistant fire chief, and chairs of the planning board and road commission receive token salaries. Elected and appointed boards all depend upon a sufficient number of volunteers willing to donate their time and experience.

Administration of town policies as approved by municipal boards and annual and special town meetings is done by the Board of Selectmen and the designated Town officials.

The Town office houses all records, tax information, cards and maps. Filing cabinets are provided each department to house its records. The budget for fiscal year 1987 was approximately \$253,323.49 with a tax rate of 21.5 mills.

The Town's financial condition is solid, and generally there has been no need to borrow money to pay bills. The Town receives revenue sharing money from the State. In 1987, this fund provided \$14,021.18 to the town.

The Town owns five pieces of property. The Town Hall, built in about 1850, sits on about one-half acre. The fire station, built in 1960, is located on another one-half acre. The other three parcels are undeveloped. One of these parcels is the Sewall Pond Conservation Area which provides residents access to Sewall Pond.

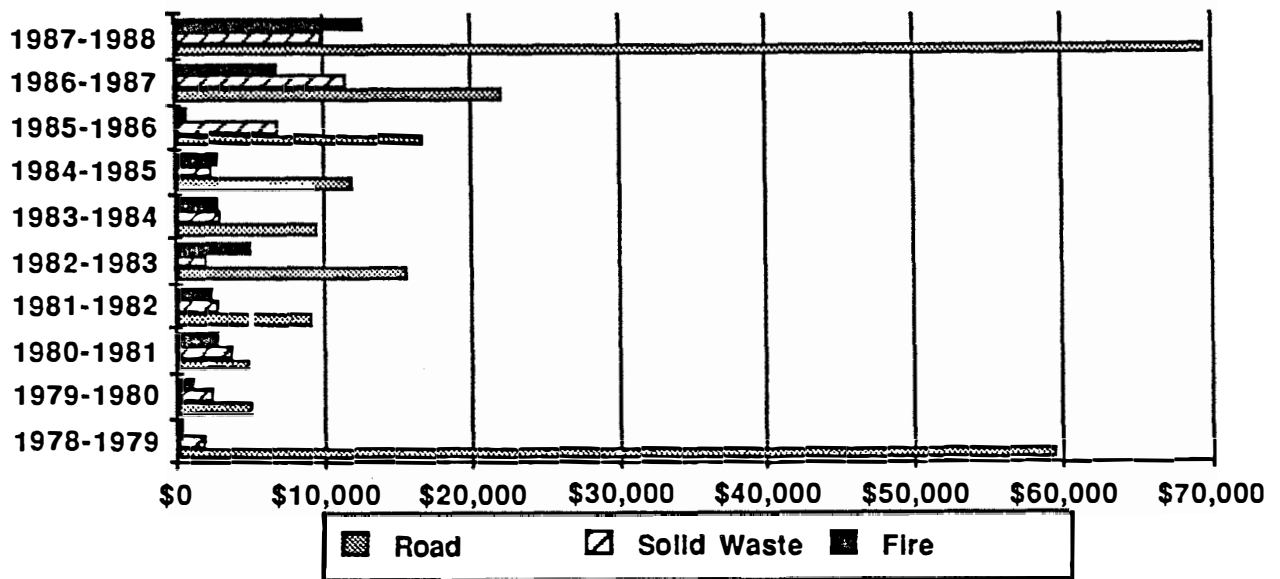
The Town provides trash collection through a contract with a hauler in Bath, where the Town's solid waste is dumped per an agreement with the City. Brush and heavy trash are collected once a year. Residents volunteer to pick up trash on Route 127 each spring. A voluntary recycling program has been established.

Snow removal contracts and road repair/maintenance contracts are supervised by a five-member Board of Road Commissioners, appointed annually by the Selectmen.

The Town Hall is a small structure that will hold about 75-80 people. It is heated only when used and does not have running water. A poorly functioning propane toilet is available. The Town maintains a well with a hand pump outside. It has good water which tested negative for radon. It is used by residents to obtain good quality drinking water.

EXHIBIT 3

MUNICIPAL EXPENDITURES BY CATEGORY
1978 - 1988



The Fire Station is also a small structure. It is heated but has no plumbing or running water. It is barely adequate to house the Town's firefighting equipment.

A general breakdown of expenditures by category is shown in Exhibit 3 for the years 1978/79 through 1988. It is clear that next to expenditures for education, the cost of road maintenance and repair has been the biggest budget expenditure for the town throughout this period.

In 1978, the actual expenditures of the Town were \$114,179. After declining expenditures in 1979 and 1980, expenditures climbed to \$203,285 in 1986 and \$307,958 in 1987. The respective expenditures of these local tax dollars for education were: in 1978, \$53,692; in 1986, \$108,702; and in 1987, \$150,530.

The property tax bill in Arrowsic is based on spending and the assessed value of real and personal property through the following formulas:

$$\begin{aligned} \text{property tax bill} &= \text{town wide mil rate} \times \text{assessed value of specific property} \\ \text{town-wide mil rate} &= \frac{\text{annual appropriation and county tax}}{\text{total assessed value of the town}} \end{aligned}$$

In recent years taxes have been increasing steadily. (See Exhibit 4) This increase has been due to an increased population and the increased spending needed to provide services for this larger population base. The primary increases have been road, municipal and education budgets. There is a concern by local residents that the increasing tax burden and outside development pressures may change the physical and social character of the Town.

The Town is currently having a professional assessor revalue each property in town for the 1989-90 tax year.

Fire Protection

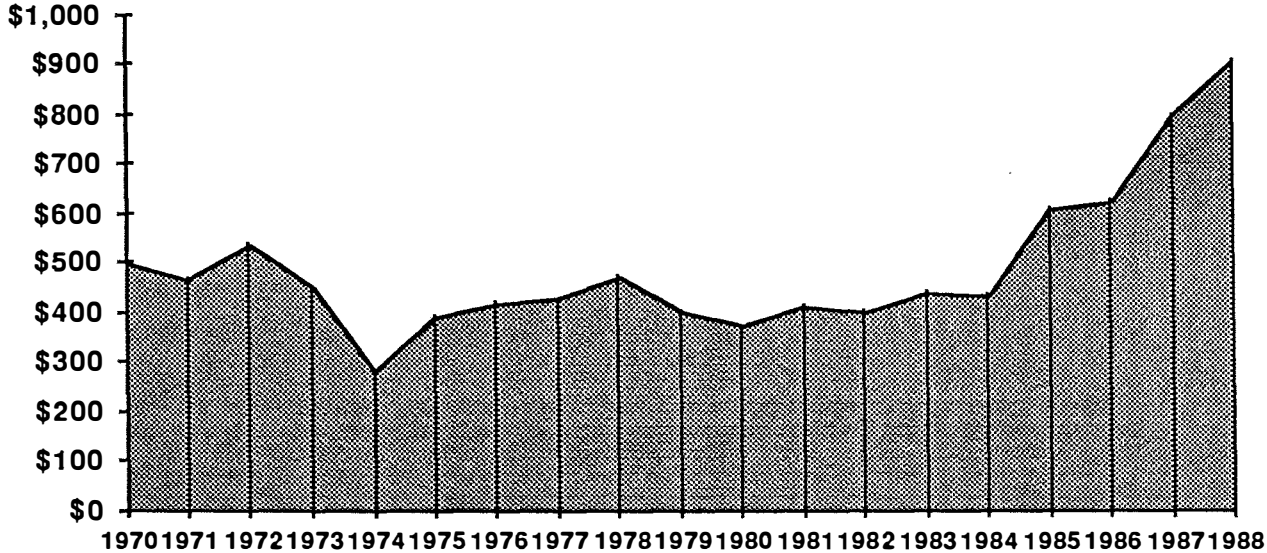
Arrowsic's fire protection is currently accomplished via a combination of resident volunteers and signed mutual aid agreements with the City of Bath (primary), and the Towns of Georgetown, Phippsburg, West Bath and Woolwich. All calls for incidents are dispatched through the Bath Police complex which in turn pages Arrowsic Fire Department (A.F.D.) volunteers on the State fire radio frequency.

The fire department responds not only to fire calls but to vehicle accidents, personal injuries and recently has been given responsibility to respond to possible hazardous waste problems. This latest task is state-mandated and requires personnel to go through specific training to be "certified." Civil Emergency Preparedness also falls under the department's area of responsibility.

Since the Arrowsic Fire Department is a "municipal" organization, operating funds are appropriated from the town's budget, and approved at Town Meeting each year. The department is also supported by two private organizations who make contributions

EXHIBIT 4

AVERAGE ANNUAL TAX BURDEN PER TAXPAYER
1970 - 1988



and donate their time, the "Ladies Auxiliary of the A.F.D." and the "Arrowsic F.D. Boosters Association, Inc."

The A.F.D. is currently going through a rebuilding stage by purchasing up-to-date equipment and through intensive training of its personnel. The equipment purchased must meet State of Maine requirements or it cannot be used in fire suppression activities. Training requirements are also set by the state with some costs shared by both the community and the state; other costs and training are solely the responsibility of the town.

The responses made in recent years by the Arrowsic Fire Department, including its mutual aid departments, are listed below in Table 12.

TABLE 12

Year	No. of Calls
1984	1
1985	0
1986	3
1987	5
1988	6

The Town maintains the following equipment: A 1988 Ford F-350 Diesel Mini-pumper - 4 wheel drive equipped for fast response, initial attack. This vehicle has the ability to receive water from our mutual aid partners in relay. The truck carries 200 gals. of water, three (3) SCBA units (air-packs) and various tools. Discussions with our mutual aid partners have indicated that Arrowsic should begin long-range planning because of the necessity of a larger pumper and more complete facilities based on our current population.

A firehouse is located near Sewall Pond. This structure is basically a two-car garage. There is no running water, and as such, there are no facilities to clean and maintain equipment and personnel after an incident.

Alternatives to the present fire protection system in Arrowsic have been investigated in recent months in an effort to secure a less expensive way to provide these services to the town. Based on a system of contracting for fire protection with the City of Bath, this cost was estimated to be approximately \$44,175.00 for a basic year's contract. This figure does not include each emergency response or compensation to other town or city departments should their assistance be needed. This figure is substantially above the existing cost of town fire protection.

Emergency Medical Services:

The community currently uses the Bath Emergency Unit which is attached to the Bath Fire Department for all emergency medical needs. This service is charged to Arrowsic on an as-used basis. The Arrowsic Fire Department does respond to these emergencies when vehicles are involved or when rescue operations are involved. The State fire radio frequency is used for notification of these incidents. Georgetown Rescue has also responded with assistance in emergencies.

The responses for the past 6 years are shown in Table 13:

TABLE 13

YEAR	NUMBER
1983	13
1984	3
1985	3
1986	9
1987	10
1988	2 (partial)
TOTAL	40

Police Protection

Arrowsic has no law enforcement officers of its own. It depends on the Sagadahoc County Sheriff's Department for all police services. The Sheriff's office is located in Bath. Response time varies due to the area covered by the department, and the limited number of personnel on duty at any one time.

Statistics for calls since the last comprehensive plan were unavailable. Current opinion within the town is that coverage is adequate.

Solid Waste Disposal

For many years Arrowsic has maintained a contract with the City of Bath to dispose of its solid waste in that city's landfill. In 1978, solid waste disposal cost the Town \$1500; in 1987, the cost was \$7322; in 1988, \$9500 was raised and appropriated for this dump contract. The cost of trash pickup has gone from \$3306.50 in 1987/88 to \$4125. in 1988/89. In addition, in 1988/89, \$1900 was raised and appropriated for recycling.

The City of Bath is going to a mandatory recycling program which will recycle paper, glass and cardboard. Other materials, such as cans, plastic milk jugs, etc., will be added as markets and processing ability are assured. Arrowsic will also have

mandatory recycling when the Bath program commences. It is currently being held up by a lawsuit. The Town will not receive any money for its recyclables. White goods, tires, construction debris and stumps can be dumped in the landfill for a fee.

The contract with Bath is a yearly one, and the Town is constantly faced with the possibility that Bath will not renew the contract or may change the contract in some major way.

The 1988 town opinion survey conducted by the Comprehensive Plan Committee illustrated that Arrowsic's residents are very supportive of recycling. 56 of 99 respondents are participating in the voluntary recycling program, and 81 of 91 respondents would participate if it reduced the town's solid waste costs. 81 of 94 respondents would participate in a recycling program even if it did not reduce the Town's solid waste costs.

The Town also takes septage to the Bath Pollution Control Facility, where Arrowsic and other area towns have built a holding facility to store the septage until the facility can process it.

Codes Enforcement:

The Town of Arrowsic has had a formal Land Use Ordinance for many years. From 1979 to 1985, the Bath Codes Enforcement Officer performed the codes enforcement and plumbing inspection duties for the Town. In June 1985, a local resident was appointed by the Selectmen to serve as CEO for the Town. As in most small towns, the CEO is also the State of Maine Licensed Plumbing Inspector (LPI). This is a part-time job. The CEO keeps complete records of all essential transactions of that office, including applications submitted, permits granted or denied, variances granted or denied, revocation of permits, appeals, court actions, violations investigated, violations found, and fees collected. On an annual basis, a summary of this record is submitted to the Department of Environmental Protection's Bureau of Land Quality Control. The CEO also checks the proposed locations of new structures for compliance with the ordinances and inspects new structures, additions, and alterations as work progresses.

The duties of the LPI are to issue permits for internal plumbing and subsurface waste disposal systems; to inspect all new systems to insure compliance with the current Maine plumbing codes; to keep records of all plumbing permits issued; to collect fees as determined by the State; and to pay the State 25% of all plumbing permit fees collected.

The CEO/LPI is compensated by a yearly salary of \$2000, plus fees from all local permits and 75% of the plumbing permit fees. The Town provides the CEO/LPI with a filing cabinet, a 100 foot tape measure, a sight level, stationery and postage. The CEO/LPI provides his own transportation and office space in his home.

Education:

Arrowsic belongs to School Union #47 (S.U. 47) which includes the City of Bath and the Towns of West Bath, Phippsburg, Georgetown and Woolwich. Arrowsic has no school facilities of its own. Most children are tuitioned to Bath schools, and the Town

pays for bussing students there. In Bath, K-6 grade students generally attend Fisher-Mitchell School; grades 7-9 attend the Bath Junior High School; and grades 10-12 attend Morse High School. In addition to traditional programs, S.U. 47 also operates special education programs. Community and Basic Adult Education are also available, and there is a regional vocational school.

For 1987/88 there were 69 Arrowsic children attending school in Bath, 2 in Georgetown, 1 in Edgecomb, 1 at Gould Academy, 1 in Montessori School (Bath), and 1 in Woolwich, for a total of 76 students. (See Exhibit 5) The enrollment for the 1988/89 year is 80 students: 59 in grades K-8, 18 in grades 9-12, 2 in special education programs and 1 in a residential care program. The cost per student to the Town for the school year 1988-89 is \$1,295.75 for kindergarten, \$2,591.50 for grades 1-8, and \$3,151.48 for grades 9-12. These costs reflect a 12% tuition rate increase over the 1987-88 school year.

Since 1978, education expenditures have remained close to 50% of total Town expenditures. In that year, \$53,692 was spent, which was 47% of the total expenditures. In 1987, the \$108,702 spent for education was 53% of total expenditures, and in 1987, the \$150,530 spent for education was 48% of total expenditures.

For students who attend other state accredited schools, Arrowsic pays up to the amount which would ordinarily be paid to Bath. This amount is at a rate set by the State.

Arrowsic has its own three-member school committee, which sits on the S.U. 47 School Board. S.U. 47 members share a superintendent and staff.

Should Bath schools become crowded, Arrowsic would not necessarily be required to start its own school system. As a member of S.U. 47, that is an issue the Town would face as an extended community. Beginning a school would be a matter of choice, assuming the State Department of Education would approve.

The Town can apply to the State at any time for permission to build a school. At the time of application, the Town would be placed on a three-year list on the basis of priority. New schools are built in the state according to need. In order for Arrowsic to get to the top of the priority list, the Town would have to demonstrate the need for a school. At this point, enrollment figures show that there is plenty of room for Arrowsic students in the Bath system, and there will continue to be room for the next five years according to present projections. Should the Town's population increase substantially, these figures would need to be reviewed. The School Board plans to review this situation every two years.

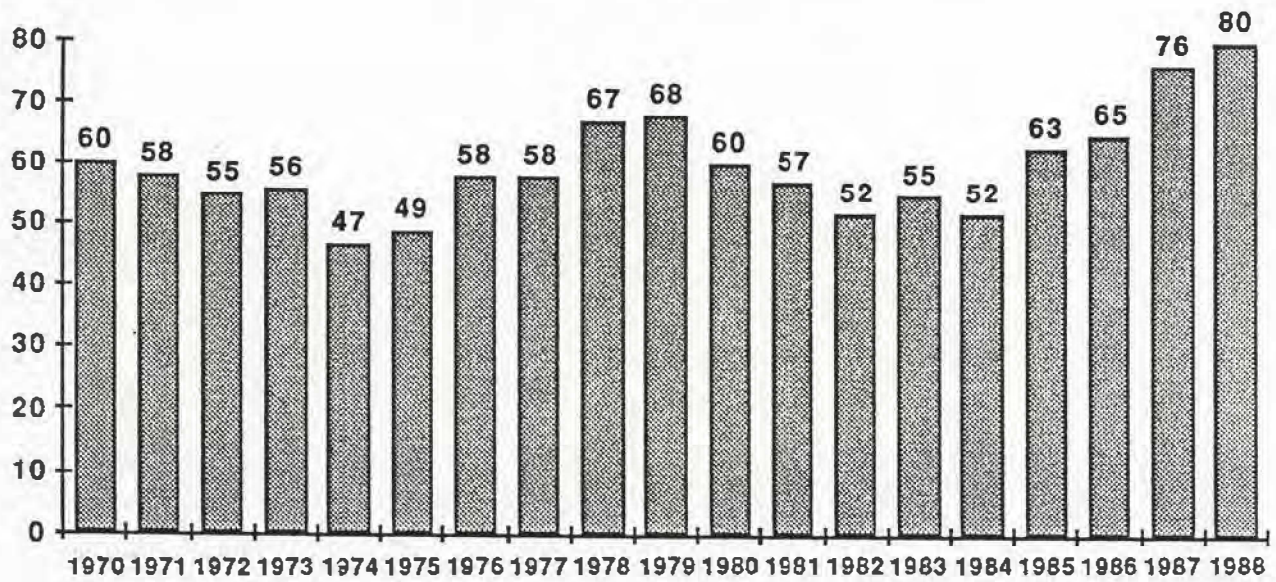
TABLE 14
Actual and Projected School Enrollment
in Bath Schools

	maximum capacity	Actual 87/88 enrollment	Projected 88/89 enrollment	89/90 enrollment	90/91 enrollment	91/92 enrollment	92/93 enrollment
Fisher/Mitchell	400	304	314	325	332	340	349
Bath Junior High School	700	514	516	514	556	567	538
Morse High School	800	727	712	707	705	711	722

Source: Bath School Department

EXHIBIT 5

LEVEL OF SCHOOL POPULATION
SCHOOL YEAR 1970 - 1988



ROADS

Arrowsic's 19.7 miles of road are a recurrent source of discussion and expense for the town. They are generally adequate for present levels of use, but would not withstand increased passenger or truck traffic without improvement. The cost of maintenance -- let alone improvement -- has recently led the town to reconsider its goals and standards with respect to roads.

The Maine Department of Transportation (MDOT) maintains the 4.2 miles of Route 127 in Arrowsic, including both the Maxwell Wilder Bridge to Woolwich and the Arrowsic-Georgetown Bridge, and 0.2 miles of the Preble Point Road. Route 127 is Arrowsic's main artery; designed to handle peak summer traffic, it should continue to meet Arrowsic's needs for the foreseeable future. Reconstruction of a 1.4 mile section of Route 127 during the summer of 1988 removed some safety hazards, but did nothing to resolve residents' concerns about speeding vehicles.

The town maintains 9.5 miles of road as town roads. These are described below. About half of these roads are paved, but none meet the "state aid" standard required of new subdivisions. In most cases the width of the town's right-of-way is not known and is assumed to be three rods (49.5 feet).

TABLE 15

ARROWSIC TOWN ROADS

<u>Road</u>	<u>Length</u>	<u>Condition</u>	<u>Status</u>
Bald Head Road	2.4 miles	gravel; requires annual maintenance	fair
Indian Rest Road	0.5 miles	repaved 1981	good
Mill Island Road	0.2 miles	repaved 1979	fair
Old Stage Road	3.7 miles	1.2 miles gravel 2.5 miles paved	good fair
Sirois Road	0.1 miles	regraveled 1980	good
Spinney Mill Road	0.6 miles	repaved 1981	good
Steen Road	2.0 miles	0.2 miles paved 1.8 miles gravel	good fair
Vail Road	0.2 miles	repaved 1981	fair

Another 5.8 miles of Arrowsic's roads are classified as "private ways." These are maintained by abutters, associations, or (in the case of the Doubling Point Road) the U.S. Government. None of these roads meet the "state aid" standard; some are barely passable.

TABLE 16

PRIVATE ROADS

Bluff Head Road	0.5 miles	gravel
Cottage Road	0.5 miles	woods road
Doubling Point Road	1.3 miles	gravel
Duck Camp Road	0.4 miles	woods road
Hill Road	0.4 miles	gravel
Newtown Road	0.5 miles	gravel
Parshley Road	0.5 miles	woods road
Stonetree Road	0.3 miles	gravel
Whitmore's Landing Road	1.4 miles	gravel

In the past, the town has not automatically "accepted" new subdivision roads. To do so would require a large increase in the road budget, presumably to be offset by higher property valuations. Many residents of these roads prefer the current arrangement; others would like the town to assume responsibility for the maintenance of their roads, in return for higher taxes.

Poor drainage, poor construction, and omnipresent ledge make the maintenance, let alone improvement, of Arrowsic's roads an expensive proposition. The town owns no construction equipment, and relies on private contractors to provide both scheduled and emergency maintenance. The town's road appropriation has doubled in two years and tripled in three, and has historically soaked up whatever 'surplus' was available:

TABLE 17

ARROWSIC ROAD BUDGET

Fiscal Year	Revenue	Disbursements	+/-
<u>1982-'83</u>	\$ 9,000 Approp. \$18,965 Receipts \$27,965 Total	\$34,520	- \$6556
<u>1983-'84</u>	\$10,000 Approp. \$20,000 Rev. Share \$10,000 Surplus \$30,000 Total	\$29,977	+\$23
(Plowing)	\$ 9,838 MDOT \$ 2,702 Credits \$12,540 Total	\$11,550	+\$990
(Paving)	18,000 Credits	\$17,352	+\$648
<u>1984-'85</u>	\$10,000 Approp. \$ 5,000 Rev. Share \$ 15,000 Surplus \$ 30,000 Total	\$44,777	-\$14,777
(Projected)			
(Audit)	\$10,000 Approp. \$36,063 Credits \$46,063 Total	\$48,907	- \$2,844
(Plowing)	\$10,732 Credits	\$ 8,850	+\$1,182
<u>1985-'86</u>	\$10,000 Approp. \$ 5,000 Rev. Share \$10,000 Excise \$12,500 MDOT	\$37,500	\$0.
(Projected)			
(Audit)	\$10,000 Approp. \$11,468 Credits \$21,468 Total	\$29,720	-\$8,253
(Plowing)	\$12,521 Receipts	\$11,800	+ \$721

1986-'87

(Projected)	\$15,000 Approp.	\$15,000	*per 1987
	\$20,000 Excise	\$20,000	town
	\$13,400 MDOT	\$13,400	report
	Surplus	\$ 3,000	
	\$48,400 Total	\$51,400*	- \$3,000

1987-'88

(Request)	\$30,000 Approp.	\$52,248 Spent
	\$20,000 Excise	\$ 3,750 Committed
	\$13,400 MDOT	
	\$15,000 Surplus	\$55,998 To date
	\$78,400 Total	

The "upgrade" of the northerly 1/2 mile of the Old Stage Road in the summer of 1987 cost double the estimate of \$23,500, and set off a town-wide debate over road standards. Several alternatives to the "state aid" standard have been suggested as being more suitable to Arrowsic's needs and topography. The newly formed Road Commission has held hearings to discuss paving the new section of road, and hopes to develop an overall plan of attack to maintain and improve existing town roads.

Any plan for Arrowsic's development must take into account the impact on its roads. Given time and money, the town can bring existing roads up to an acceptable standard for present levels of use. Increased use caused by new development would cause rapid deterioration of existing roads and would make expensive construction inevitable. The consensus of the survey and interviews by the Planning Board concerning roads was "Maintain but don't improve."

Route 127 Capacity Analysis:

In 1987 the highest recorded average annual daily traffic on Route 127 in Arrowsic was 2,780 vehicles. Based on the 1985 Highway Capacity Manual for 2-lane rural highways, this figure reflects a level of service between B and C with A representing free flow of traffic and F representing heavily congested flow where highway demand exceeds capacity. The actual level of service experienced on various Sections of 127 is primarily a function of the amount of passing space available in each segment. The greater the available passing length, the better the traffic flow.

Based on this data, it is apparent that, at present, Route 127 is operating well within its capacity limits. However, given anticipated growth in both Arrowsic and Georgetown and rising levels of patronage at Reid State Park, the ability of Route 127 to accommodate traffic at acceptable levels of service into the future must be monitored to ensure continued operation of this roadway at reasonable speed and safety levels.

LAND USE

Arrowsic is divided into three zoning districts: Resource Protection, Shoreland, and Rural Residential. There is currently no commercial district or marine uses district.

The Resource Protection District is designated by characteristic wetland soils and vegetation, which are listed in the Zoning Ordinance. Areas in this district include wetlands, marshes, swamps, bogs, flood plains and land that, due to configuration, will be subject to severe erosion if disrupted. Use of land in this district is severely limited, with most uses being prohibited outright, and a few permitted only with a conditional use permit from the Codes Enforcement Officer or Planning Board. Structures must be set back 100' from a resource protection district boundary.

The Shoreland District is all land within 250' of normal high water of Sewall Pond, any river, or salt water body. The purpose of this district is control and protection of water quality, aquatic life, fish, spawning grounds; birds and other wildlife habitat; and to prevent damage by erosion through improper uses. Use of land in this district is limited, and most uses involving a structure or some construction and earth moving require a conditional use permit. The Zoning Ordinance requires that structures be 100' back from normal high water.

Land that does not fall in the Resource Protection District or the Shoreland District is in the Rural Residential District. In 1979 the Town enacted 2-acre zoning and required that lots in subdivisions must average 5 acres. The effect of this zoning has been to decrease the density of housing except in two notable older areas: Preble Point and near the Town Hall. In the 1988 survey, 82% of the respondents said the Town should not allow lots less than 2 acres, and 68% said that the Town should require larger lot sizes in some areas, generally indicating 5-10 acres. There is concern that the 2 acre/5 acres in subdivisions is not an effective way to preserve open space; it just spreads out the housing.

Residential land use is scattered throughout Arrowsic and accounts for approximately 651 acres or 14.2% of the town's total acreage. Most residences are used year round, however 16 year-round houses are not occupied during the winter. There are 194 year-round dwellings in Arrowsic and 23 seasonal homes which are not suitable for year-round occupancy.

About 800 acres in Arrowsic are publicly owned or are subject to varying levels of development restriction that will tend to maintain them as open space. These include Bald Head, held by The Nature Conservancy; the Holt Woodland Research Foundation property; the Sewall Pond Conservation Area; other Town-owned, State and Federal land; land in the Federal Water Bank Program; and land placed under the Tree Growth Tax Law. Ninety-six percent (96%) of the survey respondents said that the Town should take measures to preserve open space and undeveloped land.

The Town's Business and Industrial District, an area 500' back from both sides of Route 127, was abolished in 1981. Some 72% of the 1988 survey respondents said that the Town should not have a business or commercial district. The only commercial activities in Arrowsic are two businesses grandfathered from the old zoning ordinance, several home businesses, a construction business and a landscaping business.

These businesses do not have buildings and equipment that produce significant additional tax revenue for the town. There is no real consensus as to where a commercial district should be located.

NATURAL RESOURCES

General Description

Arrowsic Island is located at the confluence of the Kennebec and Sheepscot River systems, and is surrounded by the Kennebec, Sasanoa and Back Rivers. The island is characterized by abundant wetlands; shallow, poorly drained soils, large areas of undeveloped woodland and spectacular views. Significant natural features on or adjacent to the island include the Back River wetlands, Sewall Pond, deer wintering yards, several eagle and osprey nesting sites, and examples of several rare or endangered plants. Maintenance of open space, wildlife habitat, as well as proper sewage disposal and maintenance of water quality are significant concerns to the town.

Topography and Soils

Land topography in Arrowsic varies from flat tidal and upland marshes to outcrops and ledges having slopes up to 45% and elevations of 100 to 130 feet. Slopes greater than 15%, generally considered to be unsuitable for development, occur mainly in the locations shown in Exhibit 6.

The soils in Arrowsic are primarily the result of glacial action. They generally are shallow and poorly drained, and include large areas of steep slopes and extensive tidal and fresh water wetlands. These characteristics pose severe limitations to all types of development, including residential construction, commercial development, agricultural activity and forest product enterprises.

Soil types in Arrowsic have been mapped by the Soil Conservation Service (Ref. 1)* to indicate soils that predominate in areas of about three acres or more. (As much as 30% of any area may consist of other soils.) This survey intensity is adequate for town planning and policy making but is insufficient to identify sites suitable for particular uses such as septic fields, for which a detailed investigation on the ground is required. A high intensity survey of the entire town is not considered feasible due to the high cost involved.

For purposes of identification, soil types have been named and classified in associations consisting of three or more soils which typically occur together. In common with surrounding towns, Arrowsic soils occur primarily in Association 2 (Hollis, Sutton, Buxton), with a small area of Association 3 (Scantic, Leicester, Scarborough). See Exhibit 7. The locations and characteristics of these soils and their limitations for various uses are detailed in Reference 1 and also located on a map available for inspection at the Town Hall. Limitations of particular interest are summarized below.

- * Severe limitations for septic installations due to shallow soils, impervious soils, and/or high water table.

* For References, see Table 23 at the end of this Chapter.

- * Moderate to severe limitations for building foundations and roads, due to presence of ledge, high water table.
- * Slight to severe limitations for agriculture involving deep tillage, due to shallow soils, stony soils, erosion potential and excessive moisture. However, some soils are well suited to grazing and hay production.

Again, it must be emphasized that individual sites can be found for all of these uses, but high-intensity use is generally precluded by the limited number of suitable sites.

Some activities for which Arrowsic soils are generally favorable include:

- * Favorable for many species of trees, with slight to moderate limitations for some species due to shallow soils and/or excessive moisture.
- * Generally favorable for wildlife, as discussed below.

The juxtaposition of shallow, poorly drained soils with wetlands which pervades the entire island affects all potential development in ways which are difficult to determine in advance. In the absence of clear evidence that development of specific sites is possible without environmental damage, the soil limitations described above should be used in developing zoning and subdivision ordinances and overall policy toward development in Arrowsic.

Wetlands

Wetlands are a significant feature of Arrowsic's topography and include both tidal wetlands and upland marshes, the latter generally associated with Scantic soils and pockets of restricted drainage. The coastal and major upland wetlands have been mapped (Exhibit 8), however many small upland marshes are not identifiable from aerial photography and remain to be mapped through inspection on the ground.

Wetland soils are widely distributed over the island, interspersed with uplands and steep slopes as noted above. Accordingly, nearly all of the upland watershed drains to a wetland before reaching open water.

Exhibit 6

MAP, AREAS OF STEEP SLOPES

This Exhibit summarizes those areas of Arrowsic having slopes greater than 15%.

[See Arrowsic_CompPlan_1989.maps.pdf](#)

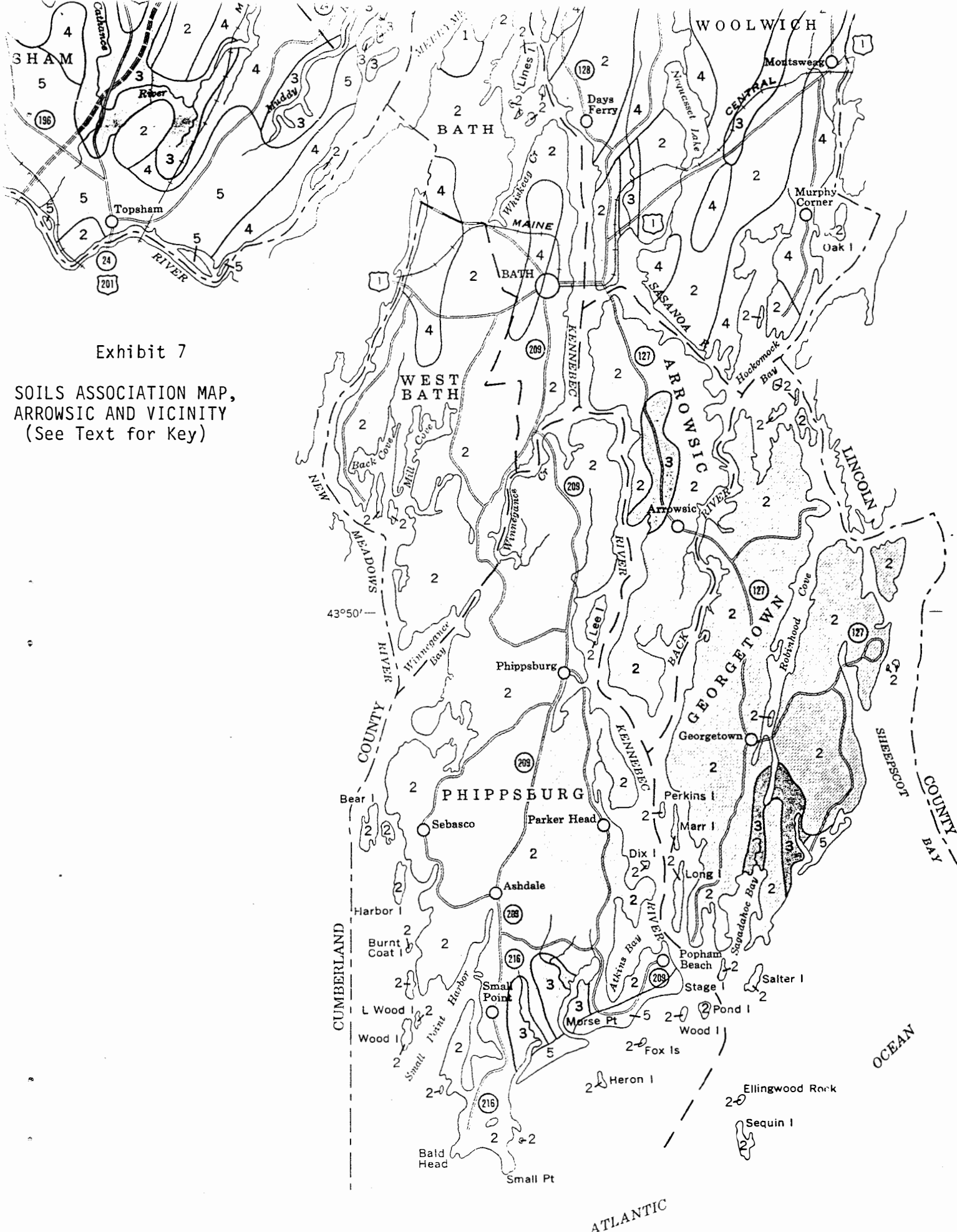


Exhibit 7

SOILS ASSOCIATION MAP,
ARROWSIC AND VICINITY
(See Text for Key)

Exhibit 8

WETLANDS MAP (See Text, Table 19, for Key)

This Exhibit delineates Arrowsic's wetlands. It was developed from Exhibit 3 and other data as part of the 1982 Comprehensive Plan, and is available for inspection at the Arrowsic Town Hall.

[See Arrowsic_CompPlan_1989.maps.pdf](#)

Waterbodies

Rivers and Ponds

Arrowsic is surrounded by three rivers: the Kennebec, the Sasanoa and the Back Rivers. In addition, numerous seasonal or tidal streams drain upland areas, frequently in association with wetlands. With few exceptions, these streams are unnamed. Named streams include Spinney Creek, Sewall Creek, Newtown Creek and Minot Creek.

Sewall Pond, the island's only Great Pond, has an area of 43 acres, a maximum depth of 11 feet, and a drainage area of about 288 acres (Exhibit 9). Both ends of the pond grade into wetlands near sea level. The pond supports a variety of warm water species as described below. Local residents utilize the pond for swimming (not encouraged), fishing and skating; it is considered a major scenic attraction.

Though spring fed, Sewall Pond tends to drain very slowly; that is, all the water is replaced only gradually, about once in every 1.7 to 2.8 years, according to Maine Inland Fisheries and Wildlife staff. For comparison, the average Maine lake flushes one to five times per year.

Algae and diatom blooms have occurred periodically in Sewall Pond for many years. According to local residents, such blooms peak on about a 15-20 year cycle. The blooms have become more intense since monitoring began in 1981 and, in 1986, changed from diatoms to blue-green algae.

The sediments in the pond bottom are known to be phosphorous rich, about 15 times the average for Maine lakes. This phosphorous is recycled from the pond bottom to the surface where it is utilized by the algae. The original source of the phosphorous is unknown. Adjacent septic systems are not considered to be significant contributors, although any additional phosphorous load should be avoided.

Due to its shallow depth, very slow flushing rate and high phosphorous load, Sewall Pond is extremely vulnerable to pollution damage and should be protected through zoning ordinances, restrictions on use of power boats and other appropriate measures. Volunteer monitoring of the pond should be continued.

Exhibit 9

CHARACTERISTICS OF SEWALL POND

Sewall Pond #9943

Surface Area	18 ha (44 a)
Max. Depth	3.4 m (11 ft)
Mean Depth	2.2m (7.3 ft)
Drainage Area	1.1 km ² (.4 mi ²)
Volume	3.94 X 10 ⁵ m ³ (3,194 acre-feet)
Flushing Rate	1.7 (flushes/year)

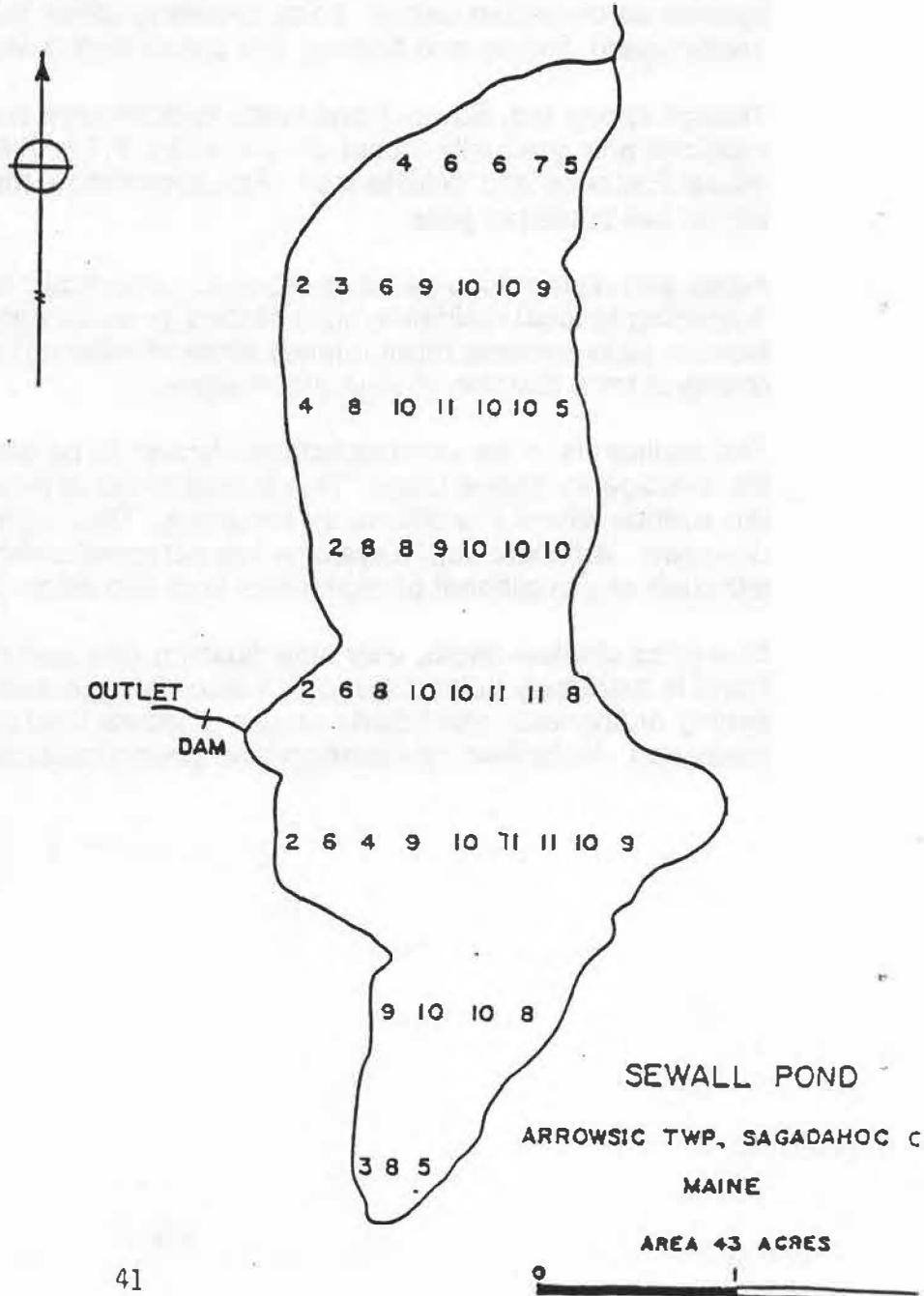


Exhibit 9 - cont'd.

Sewall Pond # 9943

	<u>1981-82</u>	<u>1983-84</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
Mean Secchi(m)	1.5	1.5	1.4	1.0	0.8
Min. Secchi(m)	1.0	0.9	0.6	0.5	0.5
TSI	100CHL	118CHL	110	141	NA
Color(SPU)	100	80	64	90	
pH	6.6	6.7	6.7(sur)	6.9	
Chla(ug/1)	26mean	60	46mean	45*(2)	43.6*(2)
TP(ppb)	52mean	53	65mean	78*(2)	72 sum
Alkalinity (mg/1)			7.0	4.0	

* inadequate sampling season

(f) fall, (c) core, (sur) surface (sum) summer

Sewall Pond is well suited for largemouth bass, and is a spawning site for alewives which enter in the spring.

Transparencies are shallow and Chla and TP levels are high. Color is extremely high in this pond which partly explains the low transparencies and high TP values; however, Chla values are also very high. High color affects transparency and TP but not Chla. The high Chla indicates that this pond is very productive.

The sediments of the pond have become phosphorus rich from the large amount of algae growing in the lake during the summer. Phosphorus in most Maine lakes is usually at very low levels (i.e., less than 10ppb) but in this lake it is very high (56 ppb). The phosphorus in the sediments is being recycled from the bottom of the pond to near the surface where it can be utilized by the algae. This recycling occurs when the bottom lake water becomes anoxic (i.e., less than 1 ppm oxygen) during calm, warm periods in the summer. As long as phosphorus is being recycled the pond will be very productive.

Since monitoring began in 1981 the pond has become more productive every year. The reasons for this have been very illusive. No source has been located to account for the very productive nature of this pond. The blooms had always been caused by diatoms until 1986.

Since 1986, significant blooms of blue green algae have occurred. Local people claim that about every 20 years Sewall Pond blooms for a couple of season then improves. Monitoring will continue to see if this is a cycle peculiar to Sewall Pond since no other cause can be found at this time.

Coastal Islands

There are six coastal islands within Arrowsic's town boundaries. Each is small, uninhabited, accessible only by boat, and privately owned. They include:

<u>Island</u>	<u>Location</u>	<u>Size</u>	<u>Notes</u>
Castle	Sasanoa R.	1/2 acre	N. of Snipe Cove
(Unnamed)	Sasanoa R.	1	Below Hall Cove
Nigger	Back R.	1/2	
Seal	Back R.	<1/4	
Crow	Back R.	3	Duck Camp (?)
Pettis Rocks	Kennebec R.	1/2	Seal haulout

Flood Hazard Areas

A flood hazard ordinance consistent with Federal Emergency Management Agency standards was adopted by the town in June 1987. This Ordinance included the Federal floodplain map for Arrowsic. This map uses datum levels of 9.5' to 10.5' and is not materially different from the previous Town Map (datum 10.0') adopted in 1972. (Exhibit 10).

Scenic Areas

Arrowsic is basically rural, having few areas of high density housing and no commercial or industrial development. This characteristic is highly valued by Arrowsic residents. Although the entire island could be considered "scenic", the areas and views listed in Table 18 are considered especially noteworthy by town residents. In addition, the State Planning Office (1986) proposed several of these areas for field verification as part of the Coastal Scenic Inventory. However, no formal scenic landscape assessment has been undertaken in Arrowsic.

TABLE 18

Scenic Areas and Views

Views from Route 127

Marsh south of Sirois Road (east and west)
Sasanoa/Kennebec Rivers from Wilder Bridge (north end)
Spinney Creek/Marsh (east and west)
Sewall Pond area
Elwell's Field
Marsh south of Elwell's (east and west)
Back River from Arrowsic-Georgetown Bridge

Views from Other Town Roads

Mill Island marsh
Bald Head area, from end of Bald Head Road
Spinney Creek and Marsh, from Spinney Creek Road
Kennebec River, from Doubling Point Road and vicinity
Back River marsh, from Indian Rest Road
Palace Cove, from Old Stage Road

Generally Scenic Areas

Mill Island
Bluff Head
Spinney Creek
Tarrs Mountain
Bald Head

Potable Water Resources and Waste Water Disposal

Potable Water:

The primary fresh water source in Arrowsic is deep wells drilled into fracture zones in the crystalline bedrock. The bedrock geology is primarily a steeply dipping schist with localized granitic intrusives. The schist has a strong lineament aligned in a generally north-south direction. Glacial erosion and scouring have developed a sharp bedrock surface relief of up to several hundred feet. Post glacial sediments, comprised largely of blue-green marine clays, and recent alluvium, have partially filled in the low areas of the bedrock surface. Generally speaking, the overburden thicknesses range from a few inches to 20 feet. However, in the north end of the island the overburden can attain a thickness of 100 feet.

Exhibit 10

MAP, FLOOD PLAIN

The current Flood Plain map is that referenced in the Flood Plain Ordinance adopted in June 1987. The map developed locally as part of the 1980 mapping project used a similar elevation. Both are available for inspection at the Arrowsic Town Hall.

[See Arrowsic_CompPlan_1989.maps.pdf](#)

Successful deep wells on Arrowsic island depend on the penetration of significant fracture zones within the bedrock complex. Two sets of fracture/joint trends are known on the island. One set follows a northwest-southeast direction, and a second set follows a northeast-southwest direction. However, predicting the specific location of a fracture zone at depth is not possible on this island. Thus, predicting the depth to water, volume flow rate, or recharge rate of a specific location is also not possible. Despite the unpredictability of finding water in a deep well bore at a specific location, water in varying quantities and depths can probably be found throughout the island, given a degree of drilling risk. Deep well bores vary from 108 feet to 285 feet in depth and produce between 2 and 50 gallons per minute. This high productivity is attributed to a good fracture zone in the bedrock and a relatively thick mantle of overlying permeable glacial deposits which provide a favorable recharge medium to the bedrock fractures.

A well survey was carried out in 1988 to determine the depth and capacity of the Island's wells. Some 90 residents responded, representing about 2/3 of the island's houses. The results are included in the Natural Resources Inventory at the Town Hall. Consistent with the above discussion, no particular pattern of depth or flow rate is discernible from these data.

Waste Water Disposal:

The disposal of the waste water from individual households by means of septic systems presents a more serious limitation on development than does the potable water supply. The generally thin overburden (much of it marine clay) and the highly irregular bedrock (ledge) present an unfavorable medium for the disposal of waste water. Clays generally exhibit low porosities, in the range of 2 to 15%, and very low permeabilities, in the order of a few milidarcies. Additionally, the clays on the island may have high water saturations (up to 80 to 90% saturation) leaving little room for additional water. This is especially true in the topographically low areas. Observations on the island have indicated that even in some of the topographically higher areas, the clays may contain high water saturations. Some of the old, shallow dug wells attest to this condition. In other areas, recent alluvium in the form of peat, organic debris and silts form a thin mantle above the marine clays, or above the bedrock. The alluvium nearly always contains a very high water saturation, in the order of 80 to 100%.

All of the above overburden conditions create a very unfavorable environment for the dispersal of waste waters throughout much of the island. The very low permeability of the clay restricts the dispersal of waste water, and if the clay already happens to contain an appreciable amount of water, then dispersal is further limited.

A number of models can be developed to predict: (1) the dispersal rate of the waste water in various sizes of leach fields; (2) the volume of waste water held in the leach field; and (3) the dispersal rate in the underlying clays, alluvium, etc. Because of varied topography, subsoil conditions, and the presence of basement rock, meaningful results of such modeling are probably of limited usefulness. However, a generalized set of guidelines can be stated:

1. Housing development and associated leach fields should be avoided in topographically low areas where overburden water saturations are 30% or higher.
2. Leach field development where waste waters may migrate to adjacent rivers, ponds, streams, or wetlands should be restricted.
3. Closely spaced housing, or multiple family housing development, on most of the island should be avoided because of the aforementioned waste water dispersal problems. The subsurface conditions simply will not provide dispersal of the waste water in the volumes associated with such development. The only exception to this restriction could be the northern part of the island where thick glacial deposits probably could handle the dispersal.

As an alternate to leach fields, overboard discharge sewage disposal systems are used by some households in Arrowsic on sites which have no suitable septic sites. (Exhibit 11.) Although nominally regulated and inspected by the State, such discharges are a potential source of pollution of local waters, tidal flats and wetlands. Currently 16 such discharges are licensed in town, of which two are seasonal and another two are for gray waste only. An attempt to impose a moratorium on further installations was defeated at the June 1987 Town Meeting. However, similar restrictions were imposed by the State in 1988, prohibiting new and phasing out existing installations wherever possible.

In view of the high potential for local pollution from overboard discharges, the town should:

1. Find ways to monitor, or have a State agency monitor, existing overboard discharges to ensure compliance with the applicable operating licenses.
2. More strictly regulate new overboard discharge installations, possibly through a town ordinance.
3. Continue to prohibit any subdivision involving the need for overboard discharge systems.

Exhibit 11

MAP, OVERBOARD DISCHARGES

This Exhibit delineates the location of the 16 overboard discharges currently licensed in Arrowsic.

[See Arrowsic_CompPlan_1989.maps.pdf](#)

Vegetative Cover and Wildlife

Vegetative Cover:

Of Arrowsic's approximately 5,664 acres, 5,158 acres are upland; 82 are tidal flat; 225 are salt marsh; and 199 are other wetlands (Ref. 2). The upland area is almost exclusively (about 95%) forested. (Exhibit 12.) On these forested areas the dominant cover types are mixed wood, oak/pine and pure white pine. White pine, red oak, and red maple are the dominant species in the overstory of these stands. Also important are red spruce, balsam fir, eastern hemlock, white oak, and birch. Of lesser importance are pitch pine, red pine, beech, cherry, poplar, ash, and alders. Important understory shrub species include witch hazel, beaked hazelnut, huckleberry, blueberries, sheep laurel, juniper, viburnums, dogwoods, and a few others. Common herbaceous species include Canada mayflower, teaberry, starflower, gold thread, lady slippers, Indian cucumber root, sarsaparilla, many fern species, mosses, lichens, lycopodiums, and many others.

Salt water wetlands are dominated by salt marsh grasses, cattails, sedges, and rushes. Fresh water wetlands are dominated by a large variety of species from trees to herbaceous species including red maples, northern white cedar, sweet gale, winterberry, pondweeds, manna grasses, cattails, and many other species.

Unique Natural Areas:

Two locations in Arrowsic are registered with the State Planning Office's Critical Areas Program as significant plant habitats. (Exhibit 13.) One is a white oak stand of 13 acres which is listed as one of ten significant white oak stands in the state. The second location is a tidal flat which supports three estuarine plant species that are rare in Maine. The species are all in the List of Maine's Endangered and Threatened Plants (Ref. 3). These species are: *Lilaeopsis (Lilaeopsis chinensis)* which is known from only six sites and listed as of Special Concern; water-pimpernal (*Samolus valerandi spp. parviflora*) which is known from seventeen sites and listed on the Watch List; and Arrowhead (*Sagittaria calycina var. spongiosa*) which is known from 22 sites and is listed on the Watch List. Similar unique estuarine habitats around Arrowsic could harbor additional rare plant species not yet discovered.

Another rare plant species occurring in Arrowsic listed by the Ecological Characterization of Coastal Maine (Ref. 4) was *Scirpus cylindricus*. This species name is not on any current species list for Maine. Attempts to determine the true identity of this species have been unsuccessful to date. This may be another species to add to the list of rare plants of Arrowsic.

A pitch pine swamp at the north end of Sewall Pond is a rare habitat in Maine, though this particular site has not been listed by any State agency as yet.

The Upper Hell Gate on the Sasanoa River is listed in the Critical Areas Program's Natural Areas File. This is a reversing falls which is of state and local significance. In addition, there was an historical bald eagle nest site in the vicinity.

Exhibit 12

MAP, VEGETATIVE COVER

This Exhibit delineates the types of ground cover present in Arrowsic, including hardwood, softwood, mixed forest and cleared land. This map was developed from aerial photography done in 1983.

[See Arrowsic_CompPlan_1989.maps.pdf](#)

Exhibit 13

MAP, WILDLIFE AND MARINE RESOURCES

[See Arrowsic_CompPlan_1989.maps.pdf](#)

Significant Fish and Wildlife Resources:

The Maine Department of Inland Fisheries and Wildlife (Maine IF&W) is currently in the process of identifying the significant fish and wildlife habitats from the Kennebec River to the St. George River, including Arrowsic. Some of the data has been made available for this plan. The findings by Maine IF&W, once completed, will include the location of these significant fish and wildlife habitats on a map and the ratings (importance) for each identified habitat. The general format used here follows closely the form that Maine IF&W will use when the information is presented.

Fisheries Habitat:

Sewall Pond was rated in 1988 as F2 which is described as a moderate value fisheries. Sewall Pond is managed for warm water fisheries and supports no cold water fisheries. The alewife run in the pond has decreased significantly in recent years. As already noted, there have been problems with algae and diatom blooms during the last few summers due to unusually high phosphorous levels. The conditions associated with these blooms (low oxygen and high temperatures) may create difficult conditions for fish survival. Species recorded for Sewall Pond include large-mouth bass, white and yellow perch, pickerel, alewives, eels, white suckers, golden shiner minnows, and pumpkin-seed sunfish.

The Kennebec, Back, and Sasanoa Rivers are all important habitat for anadromous and pelagic species. Examples of the anadromous species are Atlantic salmon, smelt, alewives, striped bass, Atlantic sturgeon, short-nosed sturgeon (a State and Federal listed endangered species) and others, while the pelagic species that utilize the river include bluefish and menhaden.

Wildlife Habitat:

Arrowsic has a significant amount of upland area available as wildlife habitat. Besides the critical habitats which Maine IF&W describes (see below), it is important to have available a variety of habitat types from open field to mature woodland to meet the year-round needs of numerous wildlife species. The lack of agricultural areas (primarily fields) and the lack of a variety of age classes of trees decrease the diversity and numbers of upland species that might be expected. A list of wildlife species one might expect to find in Arrowsic are listed in Appendix (A).

One way of evaluating the historical and current status of populations of wildlife is to look at harvest records. The registered white-tail deer harvest and fur tagging records are the two records available. These figures are present in Appendices (B) and (C). Comparing the deer harvest records from Arrowsic to all of Sagadahoc County shows that Arrowsic's deer harvest is considerably lower per square mile than the whole county. When looking at a 25-year period from 1960 to 1984, the harvest in Sagadahoc County averaged 2.20 per square mile, while in Arrowsic it averaged 1.15 per square mile. Since 1939, (when first records are available) Arrowsic has averaged 9.12 deer harvested per year and 1.03 per square mile. These differences could reflect several conditions including fewer hunters, less land available to hunters, or lower population densities due to less than optimal habitat conditions.

The critical wildlife habitats which Maine IF&W has identified and delineated include the following: (1) wetlands; (2) water courses; (3) deer winter range; and (4) other unique or critical habitat. These critical habitats deserve special mention and consideration because of their importance.

(1) Wetlands.

Arrowsic has a significant amount of wetland area, the majority of this being salt marsh. The types of wetlands found in Arrowsic, as classified by both Maine Inland Fish and Wildlife and by the Federal Government, are listed on Table 19 and are located on Exhibit 8.

In addition, the marine wildlife habitats (primarily coastal wetlands) of Arrowsic have recently been reclassified by the Maine Fish and Wildlife as shown on Table 20. This new classification system defines marine wildlife habitats in the following manner: Class A are areas of national or statewide significance for coastal wildlife, supporting an exceptionally high abundance and diversity of wildlife. Class B are areas of significance within a region of the Maine coast that supports a high abundance and diversity of wildlife. Class C are areas of local significance that support moderate abundance and diversity of wildlife.

Table 19

WETLAND TYPES AND CLASSIFICATIONS FOR WATERFOWL

- A. Wetland Types found in Arrowsic using the Federal Wetland Classification System. Symbols are used on Exhibit 8.

Estuarine Intertidal Flat Mud Regular Tidal - E2FL3N

Estuarine Intertidal Flat Sand Regular Tidal - E2FL2N

Estuarine Intertidal Flat Mud Irregularly exposed Tidal - E2FL3M

Estuarine Intertidal Rocky shore Regular Tidal - E2RSN

Estuarine Intertidal Narrow-leaved persistent Regular Tidal - E2EM5N

Estuarine Intertidal Narrow-leaved persistent Irregular Tidal - E2EM5P

Estuarine Subtidal Open water - E1OWL

Palustrine Forested Deciduous Seasonal - PF06C

Palustrine Forested Broad-leaved deciduous Seasonal Saturated - PF01E

Palustrine Forested Narrow-leaved evergreens Saturated - PF04B

Palustrine Scrub/shrub Broad-leaved evergreen Saturated - PSS3B

Palustrine Scrub/shrub Broad-leaved deciduous Seasonal Saturated - PSS1E

Palustrine Scrub/shrub Broad-leaved deciduous Seasonally flooded - PSS1C

Palustrine Emergent Narrow-leaved persistent Semipermanent flooded - PEM5F

Lacustrine Limnetic Permanent open water - L10WH

B. Wetlands types and ratings for waterfowl in the Town of Arrowsic by Maine Department of Inland Fisheries and Wildlife.

<u>Wetland Name</u>	<u>Wetland Type</u>	<u>Rating for Waterfowl</u>
E. bank of Fiddler Reach	Coastal Shallow Fresh Marsh	moderate
1 mi NE of Sewall Pond	Coastal Salt Meadow	moderate
Mill Island Pond	Coastal Salt Meadow	moderate
SW corner of Hanson Bay	Coastal Shallow Fresh Marsh	moderate
Back River Drainage	Coastal Salt Meadow	moderate
Sewall Pond	Inland Open Fresh Water	low mod.
1 mi E. of Green Point	Wooded Swamp	moderate
E. of Fisher Eddy	Coastal Salt Meadow	moderate
1 mi W. of Mill Island	Wooded Swamp	low

Table 20

CLASSIFICATION OF MARINE WILDLIFE HABITATS OF ARROWSIC
BY MAINE IF&W

<u>Location</u>	<u>Class</u>
Back River	A
Hanson Bay	A
Brookings/Hockomock Bay	A

No areas rated B	

Squirrel Point	C
Pettis Rocks	C
Fisher Eddy	C
Fiddler Reach	C
Sasanoa River	C

(2) Water Courses.

This includes all brooks, streams, and rivers, a significant area because Arrowsic is surrounded by rivers. Maine IF&W recommends that an area 250 feet from the high water mark be designated as a Water Resource Protection District, a zoning district in which specific provisions are made for the protection of wildlife habitat. Maine IF&W has developed a model ordinance defining such a district.

(3) Deer Wintering Range.

Two deer wintering areas have been documented in Arrowsic. These deer wintering areas are rated D5 which means they are of indeterminant status and have not been evaluated.

(4) Unique or Critical Habitats.

There are numerous features which can be included in this category; all of the current habitats listed by Maine IF&W are included below with any occurrences in Arrowsic noted. Some of this information came from the Sheepscot Bay Report (Ref. 5); more up-to-date information should be available soon.

- a) Colonial Nesting Seabird Islands: None
- b) Wading Bird Rookeries: None
- c) Bald Eagle Nest Sites: Historical site in the vicinity of Upper Hell Gate on the Sasanoa R. Other historical sites may have been at Tarrs Mtn. or Bald Head. Bald Head has been considered as a possible site for an eagle nesting platform.
- d) Osprey Nest Sites: Bald Head. Site has been used in recent years but was not used in 1988.
- e) Shorebird Feeding and Roosting Areas: Back River, Pettis Rocks, Hansor Bay, Fisher Eddy.
- f) Seal Haul-outs: Pettis Rocks
- g) Other Special Wildlife Habitats: Numerous feeding and roosting areas for bald eagles around the island.

Marine Resources:

Due to its history and local circumstances, Arrowsic lacks almost all of the typical marine resources of an island community: there is extremely limited public access to the shore, no public docking or mooring and no shell fishing. This section describes the current status of these resources.

Mooring and Docking:

Mooring and docking are limited to private facilities maintained by property owners having deeded access to the shore. Those identified in September 1988 (25 moorings and 25 docks) are mapped in Exhibit 14. With one exception, these facilities are for small pleasure craft generally less than 20' long.

There are currently no ordinances covering moorings in town waters. Although mooring density is currently low, potential congested areas exist, such as the Wilder Bridge and Doubling Point areas. If mooring densities increase in the future, the town should consider the adoption of an appropriate ordinance and the appointment of a Harbormaster.

Shore Access:

Arrowsic has several locations of historical or traditional access to the shore (Table 21) but only one legal access: off Sirois Road. This location is on tidal water and for foot access only. It is used primarily for winter access to ice fishing for smelt.

For some years the town has researched the legal antecedents of the traditional accesses in an attempt to establish a legal public access to the shore having adequate parking, deep water, shelter and acceptability to abutters. Although these efforts have failed, interest by town residents in establishing a suitable shore access remains high.

Table 21

TRADITIONAL ACCESS TO THE SHORE

Kennebec

Under Wilder Bridge (fishing only)

Whitmore Landing Subdivision (private)

End of Bald Head Road (no recent use, in dispute)

Bald Head subdivisions (various, private)

Sasanoa

End of Preble Point Road (no recent use, no room)

Sirois Road town landing (tidal, foot access only)

Mill Pond (formally abandoned)

Back River

Indian Rest Road (may have defaulted to abutters)

Sewall Pond

At Route 127 (private property)

Sewall Pond Conservation Area

Exhibit 14

MAP, DOCKING AND MOORING AREAS

This Exhibit locates all moorings and docks or floats in Arrowsic waters as identified by a survey done in September 1988.

[See Arrowsic_CompPlan_1989.maps.pdf](#)

Shellfish:

All tidal flats in town are closed to shellfish harvesting due to the effects of many years of industrial and sewage pollution from upriver towns and industries. Although such pollution has partly abated, it is expected to be many more years before the flats can be reopened. Therefore, the potential yield of shellfish is unknown.

Although there is little that the town can do about pollution from outside sources, control or elimination of the town's overboard discharges can and should be pursued.

Finfish:

An alewife run at Sewall Pond has gradually died out as a result of stream eutrophication, fluctuating water levels and inconsistent management (Ref 6). In 1988 the town allowed the harvest rights to revert to the State. No harvest has taken place for several years. Previous harvest records indicate that a modest commercial fishery may be possible. The Conservation Commission has requested Dept. of Marine Resources staff to design a fishway for the Sewall Pond outlet so that, if funds become available in the future, this improvement can be quickly implemented. It is speculated that an increase in alewife smolts in the pond during the summer may favorably affect the summer algae blooms.

A modest winter smelt fishery exists on the "Wrinkles" (Hanson Bay), a tidal flat which typically freezes over in January through March. Although some fish are sold, the fishing is primarily recreational. Several residents provide ice camps and/or parking for visitors.

Other fisheries which have been conducted at Arrowsic now or in the past include:

- * Herring weirs at several locations along the Back River. This fishery was probably extinct by the early 1900's, if not earlier.
- * Eel fishing for bait.

Aquaculture:

No aquaculture operations exist in Arrowsic or in the surrounding towns. Although future improvements in water quality may increase the feasibility of such operations, they are unlikely to be significant in the near future.

Forestry and Agriculture

Although neither forestry nor agriculture are economically significant in Arrowsic at present, they were historically important and represent two of the few alternatives to housing development for producing an economic return from large tracts of land. Therefore, the town, as part of an overall policy of preserving open space, should take whatever measures are available to encourage farming and forestry on the island, including continued emphasis on erosion control, topsoil retention and use of Tree Growth and Farm and Open Space Laws.

Farming:

Although there are no full-time commercial farms in Arrowsic at this time, several part-time operations include cattle, sheep, and horses, and involve about 200 acres of land. The major impediments to expanded farming activity include high land values, unsuitable soils, uncleared land, and loss of farming infrastructure; the major advantage is proximity to the local market. These factors appear to lead toward a combination of pasture and forage crops which can utilize the available soil and specialized (niche) agriculture which can take advantage of the increasingly up-scale local market. Examples of the latter include greenhouse and row cover vegetables, shiitake mushrooms, and apiary products. Christmas tree plantings are a possible alternative to pastures on some formerly open land now grown up to brush.

Forestry:

As with agriculture, there are no full-time commercial forestry operations or Tree Farms in Arrowsic at this time. However, many landowners cut firewood and sell stumpage from time to time. Recent operations have included woodchip harvesting as a means of reclaiming pasture land or thinning potential saw timber. The town has no sawmill or other timber consumer.

Arrowsic has only minimal ordinances controlling timber harvesting. Given the island's steep, shallow and erosion prone soil, these ordinances may need to be strengthened in the future to properly control wood road construction and public road setbacks. A model ordinance is available from the State as a possible starting point.

Two landowners have placed their woodland (total 203 acres) under the Tree Growth Tax law. Should taxes rise, additional applications for this special tax treatment may be expected.

Agricultural and Forest Soils:

Arrowsic's soils are not considered "suitable" for agriculture by the standards of commercial, highly mechanized agribusiness. While this is true for large operations involving tillage, the island has in the past been used extensively for pasture and hay, and may be more suited for such use than for forestry. In addition, limited specific areas ranging from garden size to a few acres are suitable for tilled crops such as vegetables. Such areas are also the most suitable for tree growth and for waste water disposal.

Although the island currently is predominantly in forest cover, limitations imposed by shallow, wet soils apply equally to many species of trees. These unsuitable soil conditions result in slow growth and stressed trees, which are subject to disease and insect damage. In spite of this limitation, small woodlots on the island can be managed and wood products harvested.

In view of the above factors, no attempt has been made to map soil suitabilities for agriculture and forestry uses, although this can be done using Ref. 1. The use of land in Arrowsic for these purposes is controlled far less by soil type than by the inclinations of landowners, somewhat influenced by the prevailing economic and political climate.

Therefore, the town should encourage these land uses in all parts of town regardless of soil type, as long as they are conducted in an environmentally sound manner.

RECREATION AND OPEN SPACE

Open Space:

Arrowsic is fortunate to have a great deal of "open space": large tracts of undeveloped land. Such open space is essential to the character of the town; more than 90% of the residents responding to the town-wide survey endorsed the idea of preserving it. Fortunately, significant portions of the remaining open space are enjoined from future development in varying degrees, ranging from actual ownership by the town or a conservation organization to reliance on the intentions of the current owners. The open space tracts which are thus protected are shown on Table 21.

The two tracts permanently in conservation status (Bald Head and Sewall Pond Conservation Area) make up only about 20% of Arrowsic's open space. The remainder (about 2500 acres) is privately owned and susceptible to development in the future. The public has no legal rights on this land, but historically has been able to enjoy it either on foot, from the water, or out the car window. Taxes on this land have doubled in the last three years as a result of mil-rate increases and can be expected to increase further in the future as the town undertakes revaluation. Each tax increase provides an additional incentive for landowners to sell or subdivide their property.

Table 22

CONSERVATION LANDS IN ARROWSIC

<u>Location</u>	<u>Size</u>	<u>Status</u>
Bald Head	296 a.	Owned and permanently protected by the Nature Conservancy.
Lost Pond Dam	~20	ASCS Water Bank Program.
Fisher Eddy Farm	~50	ASCS Water Bank Program.
Sewall Pond Conservation Area	13	Town Property, east shore Sewall Pond. Restricted to conservation uses by Deed of Gift.
Holt Woodland Research Foundation	~200	Owned by private Trust, used by UMO for forest research, no restriction on further development.
(various)	~200	Two properties recently placed under the Tree Growth Tax Law.

Recreation:

A majority of respondents to the town-wide survey favored outdoor, non-competitive recreational activities such as walking, bicycling, nature watching, swimming and skating. These activities are supported by maintenance of open space, as discussed above. Other current town policies, such as the ban on All Terrain Vehicles and the continued maintenance of the Sewall Pond Conservation Area, are consistent with residents' desires and should be continued. In addition, the town should pursue good relations between landowners and land users, through education and communication, to ensure that landowners do not post their land in response to a careless minority. In the long term, it is possible that landowners would be willing to act cooperatively to establish cross-country ski and hiking trails and similar facilities open to all residents.

Table 23

LIST OF REFERENCES TO THE NATURAL RESOURCES SECTION

- (1) Soil Survey of Androscoggin and Sagadahoc Counties, Maine. USDA Soil Conservation Service. November, 1970.
- (2) Spencer, H. E. Jr., and A. Hutchinson, 1974. An Appraisal of the Fishery and Wildlife Resources of the Bath-Brunswick Regional Planning Unit. State Planning Office, Augusta, Maine.
- (3) Official List of Maine's Plants that are Endangered or Threatened.
- (4) Energy Resource Co., Inc. 1978. An Ecological Characterization of Maine's Coast North and East of Cape Elizabeth. Off. Biol. Serv., U.S. Fish & Wildlife Service, Newton Corner, Mass.
- (5) Hutchinson, A. E. and S. J. Lovett. 1983. Marine Wildlife Inventory of Sheepscot Bay, Maine. Maine Dept. of Inland Fisheries and Wildlife. Augusta, Maine.
- (6) Report on Sewall Pond Alewife Fishery. Sperling et.al. ca. 1980.

COMMUNITY ISSUES & CONCERNS

Population

1. The population growth rate of the Town over the past ten to fifteen years has been too rapid.

Housing

1. The rate of new housing construction, especially in subdivisions, has been too rapid.
2. Land speculation is occurring in Town.

Recreation and Open Space

1. As a result of unrestricted residential growth, there has been a significant loss of open space, undeveloped land and coastal access in town.
2. The Town is losing its rural character.
3. There is inadequate public access to coastal areas in town.

Natural Resources

1. Surface and groundwater quality are being degraded by development.
2. Critical wildlife habitat is being lost to development.
3. Coastal marine resources are being polluted by overboard septic discharge systems.

Roads

1. Arrowsic's dirt and gravel roads tend to be substandard.
2. The cost of continued upgrading and maintenance of Arrowsic's roads is increasing.
3. Should subdivision roads be accepted as town roads?
4. Speeding vehicles on Route 127.

Municipal Facilities and Services

1. High taxes and the cost of all town services.
2. Increasing tax burden on existing shorefront lots which are owned by long-term residents.

3. There is no long-term solution in Arrowsic for the disposal of solid waste.
4. There is a significant need for an upgraded town hall and meeting facility in Arrowsic.

GOALS AND OBJECTIVES

HOUSING:

Goal:

To maintain and improve the quality of existing dwellings, providing safe, sanitary and affordable housing. To allow housing of all types. To limit housing growth to a level that can be reasonably supported by taxpayers.

Objectives:

- Allow a variety of housing types.
- Allow safe and sanitary housing for low and moderate income, elderly and handicapped residents.
- Permit higher density housing in selected areas in order to facilitate affordable housing. Encourage the provision of affordable housing in conjunction with future subdivisions.
- Regulate the impact of housing and population growth on the town through a growth control ordinance.
- Develop incentives for housing and subdivisions which protect significant parcels of open space and provide access to them.

LAND USE:

Goal:

To encourage a pattern of community growth and development that complements existing land uses, guides growth away from areas unsuitable for development, and sustains a high quality living environment into the future.

Objectives:

- Ensure that newly developed areas are compatible with existing uses of land.
- Protect historic buildings and sites.
- Protect the quality of surface and groundwater by directing development into areas with adequate soil capability for waste disposal.
- Protect Route 127 as the major artery in the Town by controlling roadside development which would decrease traffic safety and convenience, and which would detract from the scenic qualities of the road.
- Preserve space for existing and future water-dependent uses.
- Provide public access to the waterfront for scenic and recreational purposes, and traditional harvesting of marine resources.
- Protect natural resources and environmental quality.
- Develop regional solutions to regional land-use problems which affect local conditions.
- Develop a policy to guide the use and disposition of tax acquired property.

Goal:

To develop a coordinated approach to land use development that incorporates comprehensive review of the impacts of growth and development.

Objectives:

- Incorporate land carrying capacity data into development design and approval.
- Consider the adequacy of existing community services and facilities in the review of all development proposals.
- Preserve and maintain open space.

- Encourage development designs and land use controls that avoid "strip development" along roadways.
- Require developers to pay their fair share of development-related municipal costs through a system of impact fees.

COMMUNITY FACILITIES AND SERVICES:

Goal:

To provide or ensure the availability of required municipal services in an efficient and cost-effective manner for both current and future needs.

Objectives:

- Construct, improve and maintain town buildings and facilities as necessary to meet the needs of the Town.
- Provide quality fire protection services to the community.
- Ensure availability of police protection for the town.
- Ensure the availability of emergency services.
- Provide a management system which will enable town officials to efficiently administer town government.
- Provide for safe, sanitary, cost-effective and ecologically responsible disposal of municipal waste through a regional cooperative system. To promote waste reduction through education and recycling.
- Investigate the options available for municipal access to the shore.

Goal:

To provide for and encourage a system of safe roads for the delivery of persons, goods and necessary services.

Objectives:

- Develop construction and maintenance standards for new and existing town roads.
- Upgrade all town roads, as necessary, to appropriate standards.
- Ensure continued maintenance of all roads in accordance with standards.
- Support appropriate measures to manage high volume and potential accident-prone areas.
- Communicate with MDOT concerning State roads.
- Improve signing of all public and private roads.

Goal:

To develop a capital improvement plan which will anticipate the present and future needs of the community and provide for the cost-effective financing of capital improvements.

Objective:

- Create a standing budget committee to assist the selectmen in developing the capital improvement plan and to annually review and update the plan.

ECONOMIC CONDITIONS:

Goal:

To encourage a stable regional economic base that will maintain a quality living environment in the town.

Objectives:

- Support regional objectives that provide economic stability to the town.
- Limit commercial activity in town to home businesses.
- Investigate the feasibility of creating a water dependent use zone to provide for potential future commercial marine activities.
- Evaluate the need for a commercial zone in the future.

NATURAL RESOURCES:

Goal:

To preserve and protect wildlife habitat and populations, fragile environmental areas and unique natural areas.

Objectives:

- Maintain or enhance wildlife populations at levels consistent with Federal, State and local management goals through the protection of species and their habitats from incompatible land uses and developments.
- Create future growth patterns through zoning to direct development to suitable areas and away from sensitive natural areas.
- Encourage use of tax incentives (including Tree Growth and Farm/Open Space laws) and land trusts to protect large tracts of undeveloped land.
- Encourage agricultural use of land to help maintain open unforested land critical to some wildlife species.
- Discourage shoreland development in and adjacent to the environmentally sensitive wetlands of the Back River and in the Sewall Pond watershed.
- Use overlay zones to protect isolated critical natural features.
- Provide for buffer zones adjacent to land set aside for conservation or for environmental research.
- Seek to cooperate with adjacent towns in protection of critical wildlife habitat along common boundaries.
- Discourage and/or prohibit the use of herbicides and insecticides by local and State agencies.
- Support State level efforts to maintain open space such as land use transfer tax, land speculation tax, and Land for Maine's Future Program.

Goal:

To protect and preserve water resources.

Objectives:

- Identify and protect subsurface water and adjacent recharge areas.
- Zone for housing densities which are consistent with existing sewage disposal capacities.

- Locate potential high density housing zones in areas consistent with future development of a municipal water supply and/or sewage system.
- Consider all wetlands as important elements of the fresh water recharge system, to be protected from pollution.
- Require owners of overboard sewage disposal systems to properly maintain such systems and to change to alternate methods wherever possible.
- Protect the water quality of Sewall Pond through restricted development of its watershed.
- Accurately define the town floodplain boundaries and protect against pollution caused by flooding.

Goal:

To protect and enhance marine resources.

Objectives:

- Secure sufficient public access to the shoreland to meet the public need for recreation and marine related activities.
- Direct the development of marine facilities and activities toward appropriate areas and avoid impact on environmentally sensitive areas.
- Support continued efforts to abate pollution in the Kennebec River system including that caused by local overboard discharge.

Goal:

Create outdoor recreational opportunities for town residents which take advantage of and are compatible with the town's natural resources.

Objectives:

- Continue efforts to maintain the Sewall Pond conservation area for walking, nature study and similar non-impact recreation activities.
- Discourage the posting of large tracts of land, while encouraging responsible use of such land by town residents.
- Encourage the development of cross-country ski, walking and horseback riding trails.

- Cooperate with public and private sources holding large tracts of property (such as the Nature Conservancy and Holt Woodland Trust) in providing educational opportunities for the public.
- Continue to restrict the use of All Terrain Vehicles (ATV's) in accordance with current ordinances.

IMPLEMENTATION STRATEGIES

HOUSING/LAND USE

1. The Town should continue to allow the variety and diversity of housing types currently permitted in the Land Use Ordinance.
2. ~~Town zoning should be revised to create a zone for higher density single and multi-family housing and for mobile home parks.~~ (Deleted at Town Meeting 3/30/89.) (Exhibit 15.) [See Arrowsic_CompPlan_1989.maps.pdf](#)
3. The Subdivision Ordinance should be revised to include a density bonus provision for subdividers who provide, either within the planned subdivision or in another location in town, at least 10% of the total lots proposed, at a price which is affordable to low or moderate income individuals, as defined by the State.
4. The town should develop a local growth control ordinance which would limit yearly housing growth to a level which can be supported by local services.
5. Town zoning should be revised to create designated "open space" zones. These zones will provide for the protection of scenic resources, recreation opportunities and ecologically sensitive areas. (Exhibit 15.)
6. The Land Use Ordinance should be revised to require all subdivisions within the previously described open space zones to be clustered developments.
7. The Land Use Ordinance should be revised to include a density bonus provision for all subdivisions developed outside the previously described open space zones and which utilize a clustered concept.
8. The Town should revise Town zoning to more effectively encourage development in areas of the Town which are environmentally suitable and which currently support development, and discourage development in presently undeveloped or sparsely developed areas or areas which are unsuitable for development due to poor soils or other environmental constraints.
9. The Town should identify all historic structures and sites within Town boundaries and work to preserve these resources.
10. To preserve Route 127 as the primary artery in Town, local zoning should be revised to place increased setback, buffering and curb cut restrictions on all development along this route.
11. The Town should develop an open dialogue with its adjacent communities concerning regional land use problems and work with these communities toward regional solutions.
12. The Town should continue to support the development of a regional planning capacity in Sagadahoc County.

14. The Town should consider the incorporation of a net residential density provision into its Subdivision Ordinance.
15. The Subdivision Ordinance should be revised to require a hydrogeologist's review of all proposed major subdivisions.
16. The Subdivision Ordinance should be revised to allow the Planning Board to request soil erosion and sediment control plans, high intensity soil maps and drainage plans for all subdivisions.
17. The Town should consider the development of a local impact fee ordinance to aid in the funding of capital facilities required due to new local development.
18. The Code Enforcement Officer, Planning Board, and Board of Appeals should strictly adhere to the provisions of the Town's Land Use Ordinances and Subdivision Standards.
19. The Town should consider the development of a Transfer of Development Rights Program to preserve open space and farmland.
20. The Planning Board should develop an administrative framework to facilitate the review of all subdivisions by appropriate Town commissions and staff.
21. The Town should consider the formation of a Community Development Corporation to promote affordable housing, access to the shore, improvement of Town facilities, and other goals of the Town.
22. New subdivisions with water frontage should be required to provide the Town with access to the shore, or to help the Town acquire access to the shore elsewhere in Town.

COMMUNITY FACILITIES

1. The Selectmen should create a Budget Committee and charge it with the development of the annual town budget, including recommending limits on annual tax rate increases, and with the development of a Capital Improvement Plan for the financing of all new capital facilities.
2. The Town should plan and prepare a budget recommendation for the future improvement and rehabilitation of the Town Hall.
3. The Town should plan and prepare a budget recommendation for the future improvement and expansion of the Fire Station and the provision of needed equipment.
4. The Town should continue to work with its surrounding communities to provide effective, affordable fire protection and emergency services to all Town residents.
5. The Town should continue to monitor the effectiveness of the County Sheriff's services to the community.
6. The Town should continue to investigate cost effective options for the disposal of its solid waste.
7. The Town should continue to support its recycling programs.
8. The Town should plan and prepare a budget recommendation for a computerized management system to aid Town officials in the administration of Town Government.
9. The Town should develop a plan for future public access to the shore and for the funding of potential acquisition programs.

ROADS

1. The Town Road Commission should draft Construction and Maintenance standards for each classification of new and existing Town roads.
2. The Town Road Commission should assess each Town road to determine its status in relation to the above standards and determine the level of work needed to bring each road up to the appropriate standard.
3. The Town should budget, as part of the Capital Improvement Plan, for the upgrading of Town roads to the appropriate standard.
4. The Town should bring existing Town roads up to the appropriate approved standard to the extent budgeted by the Capital Improvement Plan.
5. The Town Subdivision and Site Plan Ordinances should be revised to require that all new roads built in Town be constructed to the appropriate standards.
6. The Town Road Commission should develop a program of road maintenance to ensure continued maintenance of all Town roads at the appropriate approved standards.
7. The Town should budget for the continued maintenance of all Town roads at the appropriate approved standard.
8. The Town Road Commission should begin a process in conjunction with other appropriate Town departments for the signing of all public and private roads.

ECONOMIC CONDITIONS

1. The Town should continue its policy of permitting home businesses throughout the Town.
2. The Town should identify and protect through zoning shoreland areas which would be suitable for future commercial marine activities.
3. The Town should work with adjacent municipalities to support new regional employment opportunities for Arrowsic's residents.
4. The Town should evaluate the need for future commercial growth and consider preserving an area in town to accommodate this growth.

NATURAL RESOURCES

1. Require buffer zones in subdivisions adjacent to land used for conservation or environmental research, within which no development and minimum disturbance to natural features is allowed.
2. Require buffer zones in subdivisions adjacent to farmland which has been accepted under the Farm and Open Space Law, within which no dwelling will be placed.
3. Provide Water Resource Protection Districts around critical shores, around Sewall Pond, and around significant wetlands by limiting development and vegetation removal.
4. Provide overlay zones to protect isolated natural habitat features such as eagle and osprey nests, as recommended by Maine Fish & Wildlife Department.
5. Bring the Shoreland Zoning Ordinance into correspondence with recent State law changes, while continuing to extend Shoreland Protection to tidal wetlands.
6. Prohibit the installation of overboard discharge sewage systems (OBD) on lots on which other means are available (regardless of cost), and the creation by division of a lot requiring an OBD. Require the periodic inspection of OBD systems.
7. Establish a comprehensive timber harvesting ordinance based on the State model ordinance.
8. The Conservation Commission should lead efforts to have the State establish restrictions on motorized boats and vehicles on Sewall Pond.
9. The Conservation Commission should develop a Management Plan for the Sewall Pond Conservation Area, covering permitted use, parking and vehicle access, long-term development, etc.
10. Based on the Management Plan, the Conservation Commission should develop an ordinance to control the use of the Sewall Pond Conservation Area.
11. The Town should continue the policy of mowing Town road sides rather than using herbicides. Further, the Town should seek similar agreements with all State agencies and utilities who may have occasion to use herbicides or insecticides in Town.
12. All Town agencies should continue to participate in regional planning activities related to pollution abatement and/or habitat protection.
13. The Conservation Commission should assess the need for outdoor recreation opportunities and develop a plan for the provision of needed facilities.
14. The Conservation Commission should continue to extend and review the Natural Resources Inventory in support of future Comprehensive Plan Revisions and Subdivision Application Reviews.

ACTION PLAN

<u>Strategy #</u>	<u>Responsible Official/Committee</u>	<u>Completed by:</u>
<u>Housing/Land Use</u>		
1.	Planning Board	Done
2.	Comprehensive Planning Committee (Deleted at Town Meeting 3/30/89.)	June 1990
3.	Comprehensive Planning Committee	June 1989
4.	Planning Board	June 1990
5.	Comprehensive Planning Committee	June 1989
6.	Comprehensive Planning Committee	June 1989
7.	Comprehensive Planning Committee	June 1989
8.	Comprehensive Planning Committee	June 1989
9.	Town Historian	Update & Continuing
10.	Planning Board, Road Commission	June 1990
11.	Planning Board	Ongoing
12.	Planning Board	Ongoing
13.	Selectmen	June 1990
14.	Comprehensive Planning Committee	June 1989
15.	Comprehensive Planning Committee	June 1989
16.	Comprehensive Planning Committee	June 1989
17.	Planning Board	June 1990
18.	Planning Board, Code Enforcement Officer, Board of Appeals	Ongoing
19.	Planning Board	June 1990
20.	Planning Board	December 1989
21.	Selectmen	June 1994
22.	Comprehensive Planning Committee	June 1989

Community Facilities

1.	Selectmen	May 1989
2.	Selectmen/Building Committee	June 1990
3.	Selectmen/Building Committee	June 1990
4.	Fire Chief	Ongoing
5.	Selectmen	Ongoing
6.	Selectmen	Ongoing
7.	Recycling Committee	Ongoing
8.	Selectmen	June 1990
9.	Conservation Commission	June 1990

Roads

- | | | |
|----|----------------------------------|---------------|
| 1. | Road Commission | December 1989 |
| 2. | Road Commission | December 1989 |
| 3. | Road Commission/Budget Committee | June 1990 |
| 4. | Selectmen/Road Commission | June 1994 |
| 5. | Planning Board | June 1990 |
| 6. | Road Commission | December 1989 |
| 7. | Road Commission/Budget Committee | June 1990 |
| 8. | Road Commission | June 1992 |

Economic Conditions

- | | | |
|----|----------------|-----------|
| 1. | Planning Board | Ongoing |
| 2. | Planning Board | June 1990 |
| 3. | Selectmen | Ongoing |
| 4. | Planning Board | June 1990 |

Natural Resources

- | | | |
|-----|----------------------------------|-----------------------------------|
| 1. | Comprehensive Planning Committee | June 1989 |
| 2. | Comprehensive Planning Committee | June 1989 |
| 3. | Comprehensive Planning Committee | June 1989 |
| 4. | Comprehensive Planning Committee | June 1989
(subject to mapping) |
| 5. | Planning Board | June 1990 |
| 6. | Planning Board | June 1990 |
| 7. | Planning Board | June 1990 |
| 8. | Conservation Commission | June 1994 |
| 9. | Conservation Commission | June 1990 |
| 10. | Conservation Commission | June 1990 |
| 11. | Selectmen/Road Commission | Ongoing |
| 12. | All Departments | Ongoing |
| 13. | Conservation Commission | June 1991 |
| 14. | Conservation Commission | Ongoing |

APPENDIX A

WILDLIFE SPECIES LISTS

These species lists are largely derived from observations made at the Holt Research Forest and adjacent areas and is as complete as the information available allows. Not all species listed may occur here and because a species is not listed doesn't mean it doesn't or won't occur here.

AMPHIBIANS AND REPTILES SPECIES LIST

SALAMANDERS: CAUDATA

Spotted Salamander	<i>Ambystoma maculatum</i>
Red-spotted Newt	<i>Notophthalmus viridescens</i>
Redback Salamander	<i>Plethodon cinereus</i>
Four-toed Salamander	<i>Hemidactylium scutatum</i>
Two-lined Salamander	<i>Eurycea bislineata</i>

TOADS AND FROGS: SALIENTIA

American Toad	<i>Bufo americanus</i>
Spring Peeper	<i>Hyla crucifer</i>
Gray Treefrog	<i>Hyla chrysocelis</i>
Bullfrog	<i>Rana catesbeiana</i>
Green Frog	<i>Rana clamitans</i>
Wood Frog	<i>Rana sylvatica</i>
Leopard Frog	<i>Rana pipiens</i>
Pickerel Frog	<i>Rana palustris</i>

SNAKES: SQUAMATA, SERPENTES

Ringneck snake	<i>Diadophis punctatus</i>
Brown snake	<i>Storeria dekayi</i>
Redbelly snake	<i>Storeria occipitomaculata</i>
Garter snake	<i>Thamnophis sirtalis</i>
Smooth green snake	<i>Opheodrys vernalis</i>

BIRD SPECIES LIST

GAVIIDAE

Common Loon - *Gavia immer*

PHALACROCORACIDAE

Double-crested Cormorant - *Phalacrocorax auritus*

ARDEIDAE

American Bittern - *Botaurus lentigenosus*

Great Blue Heron - *Ardea herodias*

Snowy Egret - *Egretta thula*

Green-backed Heron - *Butorides striatus*

Black-crowned Night-heron - *Nycticorax nycticorax*

ANATIDAE

Snow Goose - *Chen caerulescens*

Canada Goose - *Branta canadensis*

Wood Duck - *Aix sponsa*

Green-winged Teal - *Anas crecca*

American Black Duck - *Anas rubripes*

Mallard - *Anas platyrhynchos*

Blue-winged Teal - *Anas discors*

Canvasback - *Aythya valisineria*

Oldsquaw - *Clangula hyemalis*

Common Goldeneye - *Bucephala clangula*

Bufflehead - *Bucephala albeola*

Common Merganser - *Mergus merganser*

Red-breasted Merganser - *Mergus serrator*

CATHARTIDAE

Turkey Vulture - *Cathartes aura*

ACCIPITRIDAE

Osprey - *Pandion haliaetus*

Bald Eagle - *Haliaeetus leucocephalus*

Northern Harrier - *Circus cyaneus*

Sharp-shinned Hawk - *Accipiter striatus*

Northern Goshawk - *Accipiter gentilis*

Red-shouldered Hawk - *Buteo lineatus*

Broad-winged Hawk - *Buteo platypterus*

Red-tailed Hawk - *Buteo jamaicensis*

Rough-legged Hawk - *Buteo lagopus*

FALCONIDAE

American Kestrel - *Falco sparverius*

PHASIANIDAE

Ruffed Grouse - *Bonasa umbellus*

CHARADRIIDAE

Killdeer - *Charadrius vociferous*

SCOLOPACIDAE

Greater Yellowlegs - *Tringa melanoleuca*

Lesser Yellowlegs - *Tringa flavipes*

Least Sandpiper - *Calidrus minutilla*

Common Snipe - *Gallinago gallinago*

American Woodcock - *Scolopax minor*

LARIDAE

Bonaparte's Gull - *Larus philadelphia*

Herring Gull - *Larus argentatus*

Great Black-backed Gull - *Larus marinus*

Common Tern - *Sterna hirundo*

COLUMBIDAE

Rock Dove - *Columba livia*

Mourning Dove - *Zenaida macroura*

CUCULIDAE

Yellow-billed Cuckoo - *Coccyzus americanus*

STRIGIDAE

Great-horned Owl - *Bubo virginianus*

Barred Owl - *Strix varia*

Northern Saw-whet Owl - *Aegolius acadicus*

CAPRIMULGIDAE

Common Nighthawk - *Chordeiles minor*

Whip-poor-will - *Caprimulgus vociferus*

APODIDAE

Chimney Swift - *Chaetura pelagica*

TROCHILIDAE

Ruby-throated Hummingbird - *Archilochus colubris*

ALCEDINIDAE

Belted Kingfisher - *Ceryle alcyon*

PICIDAE

Yellow-bellied Sapsucker - *Sphyrapicus varius*

Downy Woodpecker - *Picoides pubescens*

Hairy Woodpecker - *Picoides villosus*

Northern Flicker - *Colaptes auratus*

Pileated Woodpecker - *Dryocopus pileatus*

TYRANNIDAE

- Olive-sided Flycatcher - *Contopus borealis*
- Eastern Wood-Pewee - *Contopus virens*
- Least Flycatcher - *Empidonax minimus*
- Eastern Phoebe - *Sayornis phoebe*
- Great Crested Flycatcher - *Myiarchus crinitus*
- Eastern Kingbird - *Tyrannus tyrannus*

HIRUNDINIDAE

- Tree Swallow - *Tachycineta bicolor*
- Barn Swallow - *Hirundo rustica*

CORVIDAE

- Blue Jay - *Cyanocitta cristata*
- American Crow - *Corvus brachyrhynchos*
- Common Raven - *Corvus corax*

PARIDAE

- Black-capped Chickadee - *Parus atricapillus*
- Tufted Titmouse - *Parus bicolor*

SITTIDAE

- Red-breasted Nuthatch - *Sitta canadensis*
- White-breasted Nuthatch - *Sitta carolinensis*

CERTHIIDAE

- Brown Creeper - *Certhia americana*

TROGLODYTIDAE

- House Wren - *Troglodytes aedon*
- Winter Wren - *Troglodytes troglodytes*
- Marsh Wren - *Cistothorus palustris*

MUSCICAPIDAE

- Golden-crowned Kinglet - *Regulus satrapa*
- Ruby-crowned Kinglet - *Regulus calendula*
- Eastern Bluebird - *Sialia sialis*
- Veery - *Catharus fuscescens*
- Swainson's Thrush - *Catharus ustulatus*
- Hermit Thrush - *Catharus guttatus*
- American Robin - *Turdus migratorius*

MIMIDAE

- Gray Catbird - *Dumetella carolinensis*

BOMBYCILLIDAE

- Cedar Waxwing - *Bombycilla cedrorum*

LANIIDAE

Northern Shrike - *Lanius excubitor*

STURNIDAE

European Starling - *Sturnus vulgaris*

VIREONIDAE

Solitary Vireo - *Vireo solitarius*

EMBERIZIDAE

SUBFAMILY PARULINAE

Tennessee Warbler - *Vermivora peregrina*
Nashville Warbler - *Vermivor ruficapilla*
Northern Parula - *Parula americana*
Chestnut-sided Warbler - *Dendroica pensylvanica*
Magnolia Warbler - *Dendroica magnolia*
Cape May Warbler - *Dendroica tigrina*
Black-throated Blue Warbler - *Dendroica caerulescens*
Yellow-rumped Warbler - *Dendroica coronata*
Black-throated Green Warbler - *Dendroica virens*
Blackburnian Warbler - *Dendroica fusca*
Pine Warbler - *Dendroica pinus*
Palm Warbler - *Dendroica palmarum*
Bay-breasted Warbler - *Dendroica castanea*
Black-and-white Warbler - *Mniotilta varia*
American Redstart - *Setophaga ruticilla*
Ovenbird - *Seiurus aurocapillus*
Mourning Warbler - *Oporornis philadelphia*
Common Yellowthroat - *Geothlypis trichas*
Canada Warbler - *Wilsonia canadensis*
Yellow-breasted Chat - *Icteria virens*

SUBFAMILY THRAUPINAE

Scarlet Tanager - *Piranga olivacea*

SUBFAMILY CARDINALINAE

Northern Cardinal - *Cardinalis cardinalis*
Rose-breasted Grosbeak - *Pheucticus ludovicianus*

SUBFAMILY EMBERIZINAE

Rufous-sided Towhee - *Pipilo erythrophthalmus*
Chipping Sparrow - *Spizella passerina*
Savanna Sparrow - *Passerculus sandwichensis*
Sharp-tailed Sparrow - *Ammodramus caudacutus*
Fox Sparrow - *Passerella iliaca*
Song Sparrow - *Melospiza melodia*
Lincoln's Sparrow - *Melospiza lincolni*
Swamp Sparrow - *Melospiza georgiana*
White-throated Sparrow - *Zonotrichia albicollis*

Dark-eyed Junco - *Junco hyemalis*
Snow Bunting - *Plectrophenax nivalis*

SUBFAMILY ICTERINAE

Bobolink - *Dolichonyx oryzivorus*
Red-winged Blackbird - *Agelaius phoeniceus*
Eastern Meadowlark - *Sturnella magna*
Common Grackle - *Quiscalus quiscula*
Brown-headed Cowbird - *Molothrus ater*
Northern Oriole - *Icterus galbula*

SUBFAMILY FRINGILLINAE

Purple Finch - *Carpodacus purpureus*
White-winged Crossbill - *Loxia leucoptera*
Common Redpoll - *Carduelis flammea*
Pine Siskin - *Carduelis pinus*
American Goldfinch - *Carduelis tristis*
Evening Grosbeak - *Coccothraustes vespertinus*

MAMMAL SPECIES LIST

SHREWS AND MOLES: INSECTIVORA

Masked shrew	<i>Sorex cinereus</i>
Short-tailed shrew	<i>Blarina brevicauda</i>
Hairy-tailed mole	<i>Parascalops breweri</i>
Star-nosed mole	<i>Condylura cristata</i>

BATS: CHIROPTERA

Little Brown Myotis	<i>Myotis lucifugus</i>
Keen's Myotis	<i>Myotis keenii</i>
Small-footed Myotis	<i>Myotis leibii</i>
Silver-haired Bat	<i>Lasionycteris noctivagans</i>
Eastern Pipistrelle	<i>Pipistrelle subflavus</i>
Big Brown Bat	<i>Eptesicus fuscus</i>
Red Bat	<i>Lasiurus borealis</i>
Hoary Bat	<i>Lasiurus cinereus</i>

RABBITS AND HARES: LAGOMORPHA

New England Cottontail	<i>Sylvilagus transitionalis</i>
Snowshoe hare	<i>Lepus americanus</i>

RODENTS: RODENTIA

Eastern chipmunk	<i>Tamias striatus</i>
Woodchuck	<i>Marmota monax</i>
Gray squirrel	<i>Sciurus carolinensis</i>
Red squirrel	<i>Tamiasciurus hudsonicus</i>
Southern flying squirrel	<i>Glaucomys volans</i>
Northern flying squirrel	<i>Glaucomys sabrinus</i>
Beaver	<i>Castor canadensis</i>
Deer mouse	<i>Peromyscus maniculatus</i>
White-footed mouse	<i>Peromyscus leucopus</i>
Red-backed vole	<i>Clethrionomys gapperi</i>
Meadow vole	<i>Microtus pennsylvanicus</i>
Muskrat	<i>Ondatra zibethicus</i>
Meadow jumping mouse	<i>Zapus hudsonicus</i>
Woodland jumping mouse	<i>Napaeozapus insignis</i>
Porcupine	<i>Erethizon dorsatum</i>

CARNIVORES: CARNIVORA

Coyote	<i>Canis latrans</i>
Red fox	<i>Vulpes vulpes</i>
Raccoon	<i>Procyon lotor</i>
Fisher	<i>Martes pennanti</i>

Ermine
Long-tailed weasel
Mink
Striped skunk
River Otter

Mustela erminea
Mustela frenata
Mustela vison
Mephitis mephitis
Lutra canadensis

HOOFED MAMMALS: ARTIODACTYLA

White-tailed deer
Moose

Odocoileus virginianus
Alces alces

APPENDIX B

HISTORICAL DEER HARVEST FOR ARROWSIC (1939 - 1987)

YEAR	HARVEST	HARVEST/SQ.MI*	YEAR	HARVEST	HARVEST/SQ.MI*
1939	0	0.00	1964	4	0.45
1940	0	0.00	1965	12	1.35
1941	5	0.56	1966	11	1.23
1942	7	0.79	1967	NA	NA
1943	0	0.00	1968	NA	NA
1944	2	0.22	1969	1	0.11
1945	5	0.56	1970	10	1.12
1946	8	0.90	1971	4	0.45
1947	0	0.00	1972	36	4.04
1948	18	2.02	1973	9	1.01
1949	10	1.12	1974	7	0.79
1950	9	1.01	1975	11	1.23
1951	5	0.56	1976	8	0.90
1952	10	1.12	1977	2	0.22
1953	14	1.57	1978	11	1.23
1954	18	2.02	1979	9	1.01
1955	12	1.35	1980	15	1.68
1956	9	1.01	1981	9	1.01
1957	5	0.56	1982	17	1.91
1958	3	0.34	1983	12	1.35
1959	17	1.91	1984	10	1.12
1960	10	1.12	1985	13	1.46
1961	11	1.23	1986	10	1.12
1962	11	1.23	1987	14	1.57
1963	6	0.67			

* Computed using 8.9 total square miles.

APPENDIX C

FUR TAGGING RECORDS FOR ARROWSIC (1977-1986)

YEAR	SPECIES				
	BEAVER	RED FOX	MINK	OTTER	RACCOON
1977	closed	0	*	0	21
1978	0	1	*	0	25
1979	closed	2	*	0	17
1980	0	2	*	0	3
1981	0	1	1	0	38
1982	0	0	0	0	3
1983	closed	2	0	0	0
1984	1	3	2	2	0
1985	3	1	0	1	27
1986	0	8	4	0	1
Average:	---	2.00	1.17	0.30	13.50

* Mink not required to be tagged.

Other species for which records are kept but were not trapped in Arrowsic include bobcat, coyote, gray fox, fisher and marten.

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