



Mantoloking Environmental Resource Inventory

First Edition – 2019

Mantoloking Environmental Commission
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1. Introduction

1.1 What is an ERI?

An Environmental Resource Inventory (ERI), or Index of Natural Resources, is a compilation of text, tables, maps and other visual information about the natural resource characteristics and environmentally significant features of an area. Traditionally called “Natural Resources Inventory,” the title “Environmental Resources Inventory” is now commonly used, reflecting the addition of manmade features to the inventory, such as historic sites, brownfields and contaminated sites.

An ERI provides baseline documentation for measuring and evaluating resource protection issues. It is an objective index and description of features and their functions, rather than an interpretation or recommendation. Identifying significant environmental resources is the first step in their protection and preservation and in assuring that future development or redevelopment protects public health, safety and welfare.

The ERI is an important tool for governing bodies, environmental commissions, open space committees, planning boards and zoning boards of adjustment. The Planning Board should adopt the ERI as part of the municipal master plan, either as an appendix or as a part of a master plan conservation element. As part of the master plan, the ERI can provide the foundation and documentation for master plan updates, ordinances, legal defense, open space or agricultural protection plans, protection of water resources, and many other municipal functions.[17]

Mantoloking’s ERI provides a brief history of Mantoloking, a discussion of its natural and man-made resources, as well as providing some recommendations to the Planning Board¹ and to the Borough Council.

1.2 Mantoloking Environmental Commission Mission

In March of 2013, the Mantoloking Environmental Commission (MEC) updated its mission statement:

“The Mantoloking Environmental Commission seeks to improve the environmental quality of our land, bay, and ocean. Through education and outreach, the Commission encourages citizens to incorporate environmentally responsible practices into homes, gardens, and daily life. The Commission’s goal is to improve the health of the land and the surrounding waters while reducing the potential to harm the environment.”

Each year, the MEC creates goals at the beginning of the year and provides an annual report to the Borough Council on its progress toward achieving the goals.

2. Borough Overview

The Borough of Mantoloking is situated on the barrier beach of the Atlantic Ocean on a peninsula originally called Island Beach, also referred to as the Barnegat Peninsula, and is bounded on the north by the Borough of Bay Head, on the south by the Township of Brick, and on the west by the waters of Barnegat Bay. All of the 284 acres which comprise the Borough lie within the flood plain of the Atlantic Ocean. The name Mantoloking translates from Indian language into “frog ground” with a secondary meaning of “sand place”. Starting in 1883,

¹ In this document, Planning Board refers to the combined Mantoloking Planning Board/Zoning Board of Adjustment.

Mantoloking was governed by Brick Township and the Mantoloking Association. The Borough of Mantoloking was incorporated April 10, 1911.

2.1 History

The lands of Mantoloking originally were owned by the Lawrence family and were part of the “Lawrence Beaches”. Joseph Lawrence received them from his father in 1690. He in turn bequeathed his holdings at various times to his sons, William and James, who later sold them to their step-brother, David Curtis. At least the southern portion of the present Borough is known to have belonged to Curtis; his family remained in the area for several generations and gave their name to Curtis Point as early as 1828. Another land mass at the northern end of the Borough was well known as High Hill Point (since washed away, but in the area of Dale’s Point – the extension of current Channel Lane) was documented in 1739. An inlet, known as Herring Inlet, had flowed to the south of this landmark and became unnavigable by 1740 and was completely closed by the first decade of the 1800s. The north and south lagoons were dug in this area in 1928.

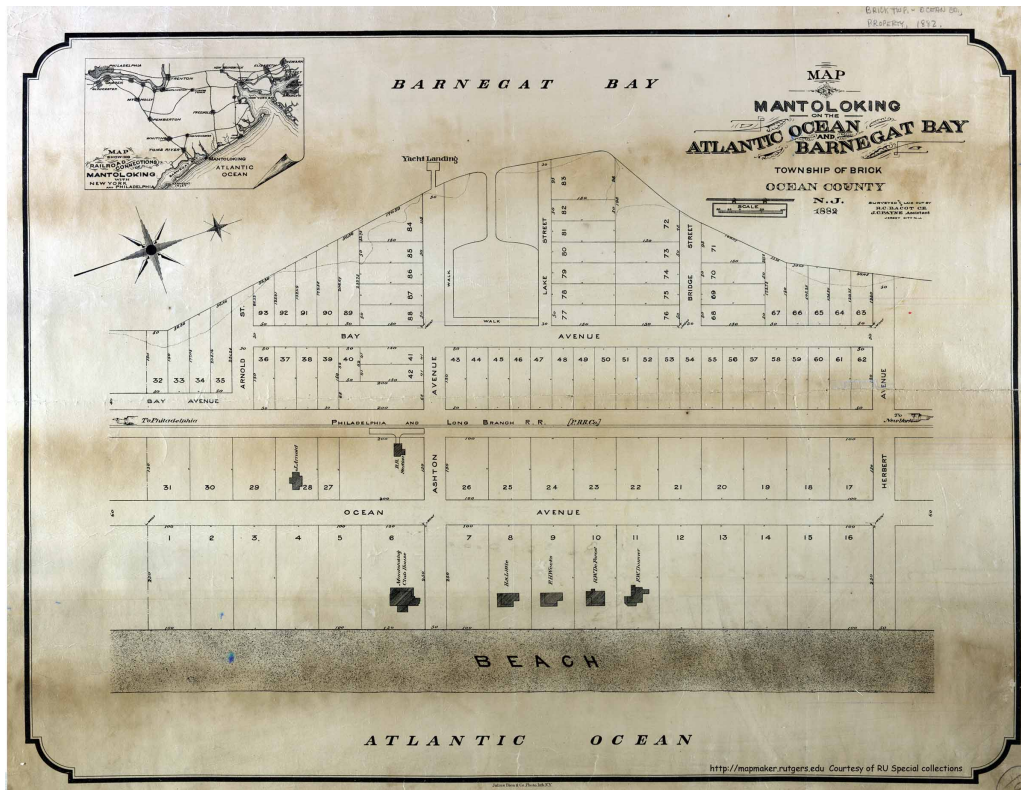


Figure 1: Mantoloking Map from 1882 [7]

According to Frederic M. Colie, a historian of the Borough, land acquisition began in 1875, the project of Frederick W. Downer of New York. Lots were sold in New York by a real estate agent named Ferdinand Fish (whose house still exists on Bay Avenue). Two corporations were formed, the Seashore Land and the Seashore Improvement Companies.[2]

Captain John Arnold came from Point Pleasant in about 1882 to be superintendent of the Seashore Land and Seashore Improvement Companies, and was responsible for the development of Mantoloking. He was the first postmaster and it is for him that Arnold St. was named.

Early transportation was provided by horse and wagon on dirt roads and by ferry across Barnegat Bay. The Ocean County Board of Chosen Freeholders adopted a resolution to build a bridge across Barnegat Bay in 1883. This bridge was completed to Old Bridge St. in 1884; it was a swing draw bridge. The second bridge across Barnegat Bay was completed in 1938 and landed at the foot of Herbert St. The third bridge was completed in 2006, also landing at the foot of Herbert St., slightly to the north of the 1938 bridge.

In 1881, the Philadelphia and Long Branch Railroad Company, a division of the Pennsylvania Railroad, completed a line from Seaside Park through Mantoloking to Bay Head. The Mantoloking train station was built in 1883. It was located on Downer Avenue across from the current Firehouse and where the Mantoloking Office of Emergency Management (OEM) building and Earle (now Van Horne)/Lindenmayer/Pilling houses currently stand. The railroad was the primary means of transportation to and from Mantoloking in these days. When the railroad bridge between Ocean Gate and Seaside Park burned on December 1, 1946, train service was suspended.

Mantoloking was divided into 96 lots of various sizes with the railroad station and six other structures drawn and identified on a map. Four of the buildings were sited at the ocean front and were marked with the name of Land Company members: Downer, Robert deForest, G. Morris Dorance and Frank Weeks. None of these cottages still remain.

The soil, which was naturally poor, was graded and approximately 50 acres were covered with topsoil imported from the mainland at great expense to facilitate the planting of lawns. Figure 2 illustrates the amount of fill that was added on top of the natural sand. It was possibly this innovation that suggested the creation of the Mantoloking Golf Club in 1896, which later became the Mantoloking Golf and Yacht Club. Only the Yacht Club remains today. There was also a Mantoloking Tennis Club as early as 1887.



Figure 2: Example of fill on top of sand at 1234 Ocean Ave. (Spring 2019)

Courtesy of Jan O'Malley

Frederick Downer continued to be the primary shaper of Mantoloking's landscape for many years. He was responsible for the establishment of the Clubhouse, which he deeded, dry, to the Borough; for the Church; and for its three identical neighboring cottages, known as Faith, Hope and Charity (no longer existent).

The Borough has always been primarily residential; there was never any industry although, for subsistence purposes, there had been at least one ice house and one fish pound. People came to Mantoloking first and foremost for vacations and their social ties were based on domestic rather than commercial interactions, as well as on outdoor pastimes.

Most of the pivotal structures in Mantoloking were built before 1900. There were incentives offered by the Land Company to anyone who built their home within a year of the date of land purchase.

The original Life Saving Station #11, known as the Swan Point Station, was established in 1871 with John Lott Dorsett as its first keeper. A new Mantoloking Life Saving Station was built at 1547 Ocean Avenue in 1898. This became US Coast Guard Station #107 in 1915. The original Life Saving Station was moved in 1908 to make way for the new road from Bay Head to

Seaside Park. There were no dunes in those days; they had been bulldozed to provide better view and access to the ocean.



Figure 3: Ocean front with boardwalk and no dunes (Circa 1906)

Courtesy of Claudia Larsen

The principal outside ties of Mantoloking were Bay Head, Point Pleasant and the area across the Bay known as West Mantoloking (now part of Brick Township). The easy availability of services from these places gave Mantoloking residents little reason to create their own; thus, there was a relatively late date of incorporation as a Borough, 1911 and, to this day, the area lacks commercial enterprises. The old general store (demolished) and the Post Office (still standing and known as the “Chimneys”) have been eclipsed in function by newer structures. The non-residential portion of the town is still located on Downer Avenue.

The original Borough Hall was built in 1928, but was torn down in 2013 after significant damage due to Superstorm Sandy. The new Borough Hall was completed and occupied in 2019. The Mantoloking Fire Company was founded in 1930 and continues as an active volunteer organization.

The Mantoloking Golf Club started in 1897 for outdoor sports and social activities for summer residents and their guests. The Golf clubhouse was originally located near the 1884 bridge. In 1897, it was relocated to the dunes north of Herbert St. The Mantoloking Golf and Yacht Club clubhouse was built in 1900 on land deeded from Frederick W. Downer and Lisa Downer through the Seashore Improvement Company. The land was south of Lake St. (now the MYC driveway) and the deed stated that no liquor could be sold on the property. The name was changed to Mantoloking Yacht Club (MYC) on July 3, 1907.

The opening of the Bay Head — Manasquan Canal (whose name was changed to Point Pleasant Canal in 1964), connecting the Manasquan River and Barnegat Bay, had significant environmental impact on Barnegat Bay. The digging began in 1916, but was not completed until early 1926. The first canal debate involved the nature of upper Barnegat Bay and the

Metedeconk River, which would change from a fresh water to salt water environment if the waterway were dug. Many residents of the upper bay area opposed the project because the intrusion of salt water would (and eventually did) bring tides and currents to the still waters, destroying or diminishing bass, perch and pike fishing, as well as destroying cranberry bogs and salt hay farming. On the other hand, when Cranberry Inlet (just north of the Seaside Bridge) closed in 1812, the Bay became less salty and took on a brownish tinge from the tannic acid from the rivers that drained the pinelands. Residents were not happy with this. Further, it was a matter of great concern that excessive high tides often followed a northeast storm. A 1914 NJ study showed that at low tides the water dropped 3' in the Bay adjacent to Bay Head, Mantoloking and Brick. After a nor'easter when the wind swung to the southwest, there were records of as much as 5' between low and high water in the upper bay. This interfered with trains and flooded nearby bayfront land. When the canal was opened, these fluctuations were significantly abated.

Immediately after its opening to navigation in 1926, the strong currents that have plagued the canal ever since began causing serious problems. In less than six months its banks, which were not bulkheaded, had been eroded, creating shoaling and nearly closing it. The two bridges began to be undermined. As a result, the sides of the canal were bulkheaded and bridges have been replaced.

The Mantoloking Garage was on the west side of Bay Avenue between Arnold St. and Downer Ave. The Lindholms bought the garage from Joseph Stilwell in 1939 or 1940. After World War II, gas was no longer pumped and in 1951, the garage was taken down. But the garage did create an environmental condition that required mitigation (2010) (See section 6.7).

2.2 National/State Heritage Database

The 1980 Mantoloking History Property Report[1] identified an historic district. It lists some sites that would be eligible to be placed in the NJ and National Registry of Historic places including the Mantoloking Yacht Club, St. Simon's Episcopal Church, the Colie/Brett house, and possibly the Chimneys. However, no individual buildings were ever formally registered and many of the buildings listed as part of the district were either destroyed by Superstorm Sandy or have been torn down. The historic district was not reinstated after Superstorm Sandy. See section 6.14.

2.3 Changes to the natural environment over time

2.3.1 Railroad Right-of-Way

The suspension of train service in 1946 and sale of the railroad right-of-way to individuals opened up a new area of development. Over time, especially the area between the north end of the Borough and Herbert St. has been built up such that the Borough is almost completely developed. The environmental impact of this development has never been assessed, but it is logical to conclude that the habitat for wild life has been substantially reduced and water runoff increased due to more impervious coverage. This railroad right-of-way could have been acquired by the Borough and preserved as dedicated open space, but this was not a priority at the time.

2.3.2 Dunes

Early pictures of the Mantoloking beach front show dunes with vegetation much like Island Beach State Park (IBSP) looks today. In the early years, most of the natural dunes were bulldozed to allow for a boardwalks that were both wooden and brick. These were destroyed by storms in 1896, 1902, and again in 1914. Finally, boardwalks were abandoned.[2, page 37].

After the 1962 storm, the Borough established a Dune Committee, hired a dune consultant, and adopted a pioneering dune ordinance that focused on building and maintaining dunes (in the 1970s). The committee monitored the dunes, encouraged dune planting, regulated traffic on the dunes, and educated the public about preserving dunes. The result was a build-up of strong, high dunes that were the envy of other ocean front towns along Island Beach.

2.3.3 Bayshore Bulkheading

A significant portion of the bay front shore originally consisted of sandy beaches. Development pressure to create more suitable waterfront lots resulted in wholesale bulkheading leaving only a miniscule portion of sandy beaches. For example, there was a cove behind the Adams/Wolf house at 1424 Ocean Ave (See Figure 7) that often filled up with seaweed. The Adams family filled the cove behind their lot in 1970. The Carpenters and Downers filled in the rest of the cove behind their houses at 1414 and 1420 Ocean Avenue in 1972 – 1973. Carpenter Lane was dedicated in 1982. This was the beginning of a trend to fill the bay shoreline and put in bulkheads. This reduced natural habitat as well as increasing the reflection of motorboats waves on the bay with resultant negative impact on the marine environment.

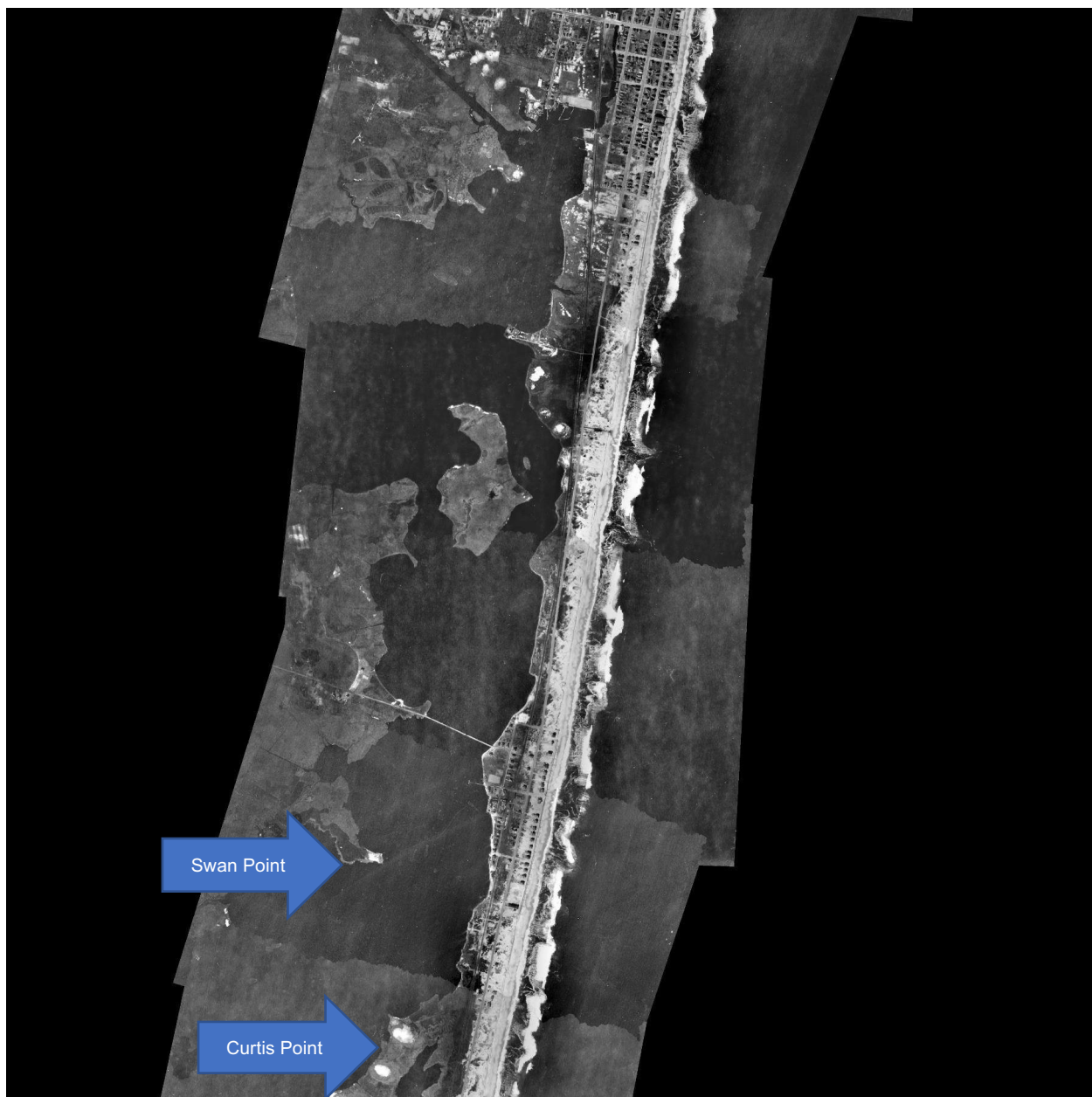


Figure 4: 1920 Aerial view of Mantoloking ocean and bay shoreline

Figure 4 is a 1920 aerial view of Mantoloking. At this time, none of the bay shoreline had been filled. It also shows that Swan Point had a sandy shore line and jutted out much further than it does now (in 2019). Note that Curtis Point has not been filled (this was done in the late 1960s).



Figure 5: Marshy shoreline along the Bay north of MYC

Courtesy of Claudia Larsen

Figure 5 illustrates the former marshy bay shoreline north of the MYC. This is now almost entirely bulkheaded, thus reducing available natural habitat for fish and wildlife, while also reflecting motor boat waves.

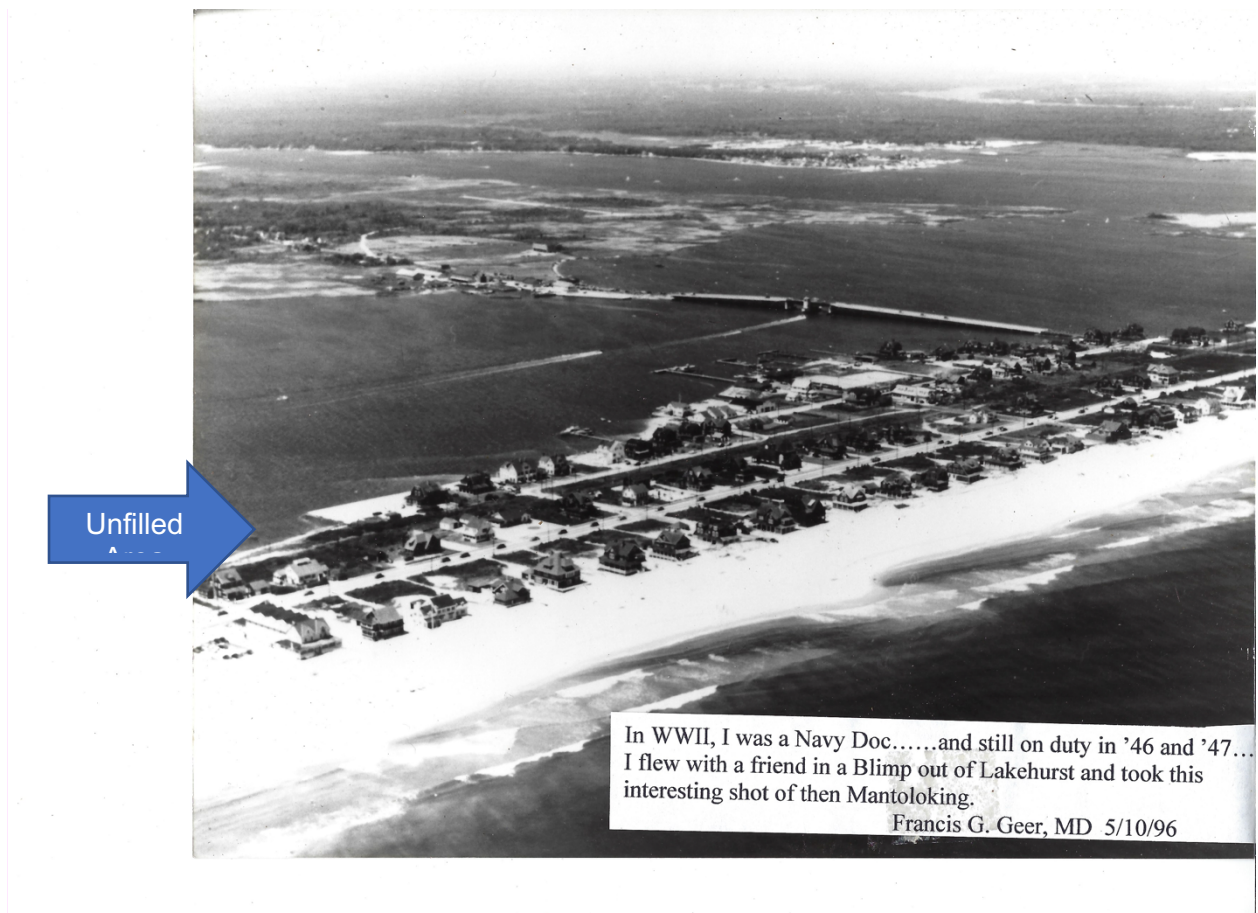


Figure 6: 1946-1947 Aerial view of Mantoloking south of the bridge to Albertson
(the Breakers Hotel)

Courtesy of Bob and Jane Post

Figure 6 provides an aerial view of the Mantoloking beach in 1946 and of the unfilled area where the Carpenter/Post property is (most southern aspect of bayfront).

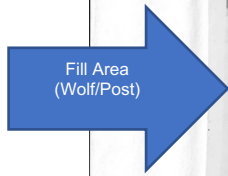


Figure 7: Aerial photo of Carpenter/Post property in 1973

Courtesy of Bob and Jane Post

Figure 7 illustrates the ocean beach in 1973 (bottom portion of the picture) and the filled bay shorefront (upper portion of picture), from Princeton Ave on the upper right, to the Carpenter house which is now on the southern side of Carpenter Lane. Comparison of Figure 6 and Figure 7 provides an illustration of how much Bay shoreline was filled and bulkheaded.

2.3.4 Storm Impact

Mantoloking has been impacted by several severe storms over the years. On April 11, 1929, a storm created a cut in the beach due to a groin (a long, narrow structure built out into the water from a beach in order to prevent beach erosion or to trap and accumulate sand that would otherwise drift along the beach face and nearshore zone under the influence of waves approaching the beach at an angle). Several houses between Princeton and Albertson were undercut by the ocean and severely damaged or destroyed. A bulkhead was built to protect houses north of Albertson after this storm.

The March 6, 1962 nor'easter was more devastating due to a full moon. It damaged three houses between Downer and Princeton Avenues (1327 – 1337 Ocean Ave).

Another major nor'easter occurred on December 11, 1992. It lasted many high tides. The ocean breached the dunes at Princeton Ave and ran to the bay for four hours. No houses were seriously damaged, but the beach was scoured such that the remains of cars placed on the beach after the 1962 storm, old boardwalks, and groins were exposed. These were removed to make it easier to plow new dunes. As a result of this storm, the NJDEP changed the CAFRA rule to increase ocean front lot setback from 30' to 60'.

On October 29, 2012, Superstorm Sandy made landfall in Mantoloking. It created three new inlets, one at Herbert St, with a northern branch, and one at Lyman Street. Many houses were more than 50% damaged, some were swept off their foundations, three landing in the Bay. The Borough had 103 structures listed and identified as Substantially Damaged as a result of Superstorm Sandy. Substantial Damage is defined as damage of any origin sustained by a structure, whereby the cost of restoration to its predamage condition equals or exceeds 50% of its predamage market value. The 103 Substantially Damaged structures included those properties with structures completely destroyed and demolished by the storm event and those damaged structures which were assessed by the Borough Officials and determined to exceed the 50% damage threshold as defined above.

Before Superstorm Sandy, 521 lots were residential and 5 commercial. The number of vacant lots (lots without structures) has changed year over year since Sandy, as illustrated in Table 1 below, due to storm damage:

Table 1: Number of vacant lots before and after Superstorm Sandy[14]

| Year | # Vacant Lots |
|-------------------------------|---------------|
| 2012 | 36 |
| 2013 (after Superstorm Sandy) | 34 |
| 2014 | 122 |
| 2015 | 139 |
| 2016 | 116 |
| 2017 | 97 |
| 2018 | 71 |
| 2019 (October) | 55 |

This reduction in built homes has had an impact on Mantoloking ratables, and, as of October 2019, the Borough had not yet achieved its pre-Sandy aggregate assessed value.

Table 2: Aggregate Assessed Value by year[14]

| Year | Aggregate Assessed Value | % Change From Prior Year | % Change from 2012 |
|----------------------------------|--------------------------|--------------------------|--------------------|
| 2012 (prior to Superstorm Sandy) | \$1,612,679,800 | 0 | 0 |
| 2013 (after Superstorm Sandy) | \$1,084,398,700 | -32.76 | -32.76 |
| 2014 | \$1,225,218,700 | +12.99 | -24.03 |
| 2015 | \$1,245,046,000 | +1.62 | -22.80 |
| 2016 | \$1,292,275,500 | +3.79 | -19.87 |
| 2017 | \$1,350,684,700 | +4.52 | -16.25 |
| 2018 (as of October) | \$1,388,856,500 | +2.83 | -13.88 |

| | | | |
|----------------------|-----------------|-------|-----|
| 2019 (as of October) | \$1,417,018,200 | +2.03 | -12 |
|----------------------|-----------------|-------|-----|

In addition to dramatically impacting the lives of the residents, Superstorm Sandy changed how development occurs. Borough ordinances have been updated to accommodate the increased height requirements due to flood elevations, and other changes have been made to reduce the visual impact of these high houses. These higher buildings occupy more light, air and open space resulting in a negative impact on attaining one of the goals of the land use law.

There have also been changes to the state and federal regulations. The Federal Emergency Management Agency (FEMA) issued revised flood mapping and flood zone designations. The mapping increased the minimum base flood elevations (BFE) for the properties within the Borough. The flood zones for mandatory design standard requirements for velocity and wave action have increased with the Borough including the implementation of the new Coastal A Zone. The FEMA Flood map can be found at:

<https://msc.fema.gov/portal/search?AddressQuery=Mantoloking%20NJ#searchresultsanchor>

3. Physical Resources

3.1 Population

Mantoloking is a fully developed single family residential community which has withstood both population pressures and development of commercial recreation. As of the 2010 United States Census, the Borough had a total population of 296, reflecting a decline of 127 from the 423 counted in the 2000 Census, which had in turn increased by 89 from the 334 counted in the 1990 Census. There were 162 households out of which 3.1% had children under the age of 18 living with them, 58.6% were married couples living together, 3.7% had a female householder with no husband present, and 36.4% were non-families. 35.2% of all households were made up of individuals, and 21.0% had someone living alone who was 65 years of age or older. The average household size was 1.77 and the average family size was 2.16.

In the Borough, the population was spread out with 4.1% under the age of 18, 2.4% from 18 to 24, 6.8% from 25 to 44, 39.2% from 45 to 64, and 47.6% who were 65 years of age or older. The median age was 64.4 years. For every 100 females there were 83.9 males. For every 100 females ages 18 and older there were 85.6 males.

The Census Bureau's 2006-2010 American Community Survey showed that (in 2010 inflation-adjusted dollars) median household income was \$151,667 (with a margin of error of +/- \$66,768) and the median family income was \$200,833 (+/- \$146,466). Males had a median income of \$98,333 (+/- \$210,103) versus \$42,917 (+/- \$32,621) for females. The per capita income for the borough was \$97,938 (+/- \$40,847). No one was below the poverty line, including individuals, families, those under age 18 and those age 65 or over. The Borough has an estimated summer population of approximately 5,000.[5]

However, since Mantoloking is developed to a very high degree, it is also desirable to base some recommendations upon the ultimate population potential of the Borough. This potential can be defined as the population capacity when fully developed, according to present zoning standards in Mantoloking. As of October 2019, there are currently 486 dwelling units in the Borough, with 26 new homes under construction; 55 lots remain undeveloped. Since the County average is 3.16 persons per household and the Mantoloking average is 1.77 persons per household, a figure of 3.0 persons per household has been applied. With a total of 541 buildable

lots (486 existing homes + 55 vacant lots), this yields a figure of 1,623 persons as the theoretical potential population of the Borough.

3.2 Land/Land Use

According to the United States Census Bureau, Mantoloking has a total area of 0.643 square mile (1.666 km²), including 0.385 square mile (0.998 km²) of land and 0.258 square mile (0.668 km²) of water (40.08%).

Most of the land in Mantoloking is privately owned. All ocean beaches in the Borough are subject to an easement which provides for public access. Ocean front property is zoned for single family residential use only.

The primary land use is residential. Nearly ninety percent (90%) of the land uses in the Borough are single-family detached residential dwellings. Public, Quasi Public, and Major Roads comprise the next largest group of land uses in the Borough. The remaining five percent (5%) of the land uses are split between commercial, government, utilities, MYC, and religious uses.[13]

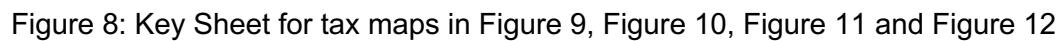
Other than roads the exceptions to private ownership are:

1. The Borough owns the site at 5 Herbert St. where the Sewer Pump Station is located.
2. The Borough owns 202 and 203 Downer Ave where the Borough Hall, and OEM Building and parking lot are sited, respectively.
3. The Borough owns 1303 Bay Ave where the post-Sandy temporary police trailer was sited.
4. As of May 2019, the Borough owns the Herbert, Downer, Princeton and Albertson Street beaches, acquired from the Mantoloking Beach Association.
5. The Mantoloking Yacht Club owns 307 Old Bridge St. and 1222 -1234 Bay Avenue and is a pre-existing non-conforming use in the residential zone.
6. The only commercial property is on the south side of Downer Avenue from the Post Office to the intersection of Downer and Bay Ave.
7. NJ American Water Company owns 0.3675 acres at 1305-1311 Bay Ave.
8. St. Simon By the Sea Episcopal Church owns 0.9918 acres at 1332- 1420 Ocean Ave where the church and rectory are located.

Table 3: Summary of Land Uses in the Borough:

| Land Use | Acres (approximate) | Percentage |
|--|---------------------|------------|
| Residential | 255.6 | 90 |
| Commercial | 0.3 | 0.1056 |
| Government | 0.8813 | 0.31 |
| Yacht Club | 3.3444 | 1.18 |
| Religious | .09918 | 0.035 |
| South Beach Association | 0.4052 | 0.14 |
| Utilities (NJ American Water; Verizon) | 0.3765 | 0.13 |
| Roads | 21.9 | 7.7 |
| Total | 284 | 99.6 |

The figures below are annotated tax maps that show how the Borough land is laid out. More specifically, they depict the current state of the build out post-Superstorm Sandy as of October 2019. A (red) dot means that the lot is vacant. A (red) N means that a new house is in the process of being built but does not yet have a TCO. Of course, these will change over time.



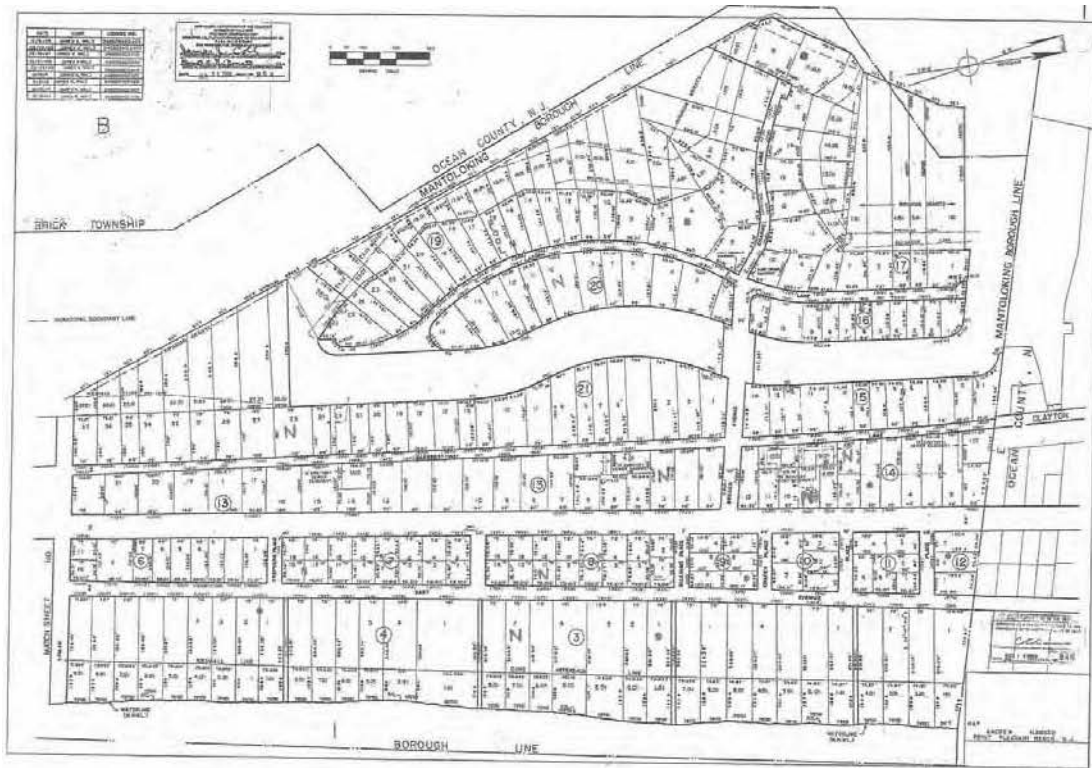


Figure 9: Dale's Point/Lagoon section of the Borough (as of October 2019)

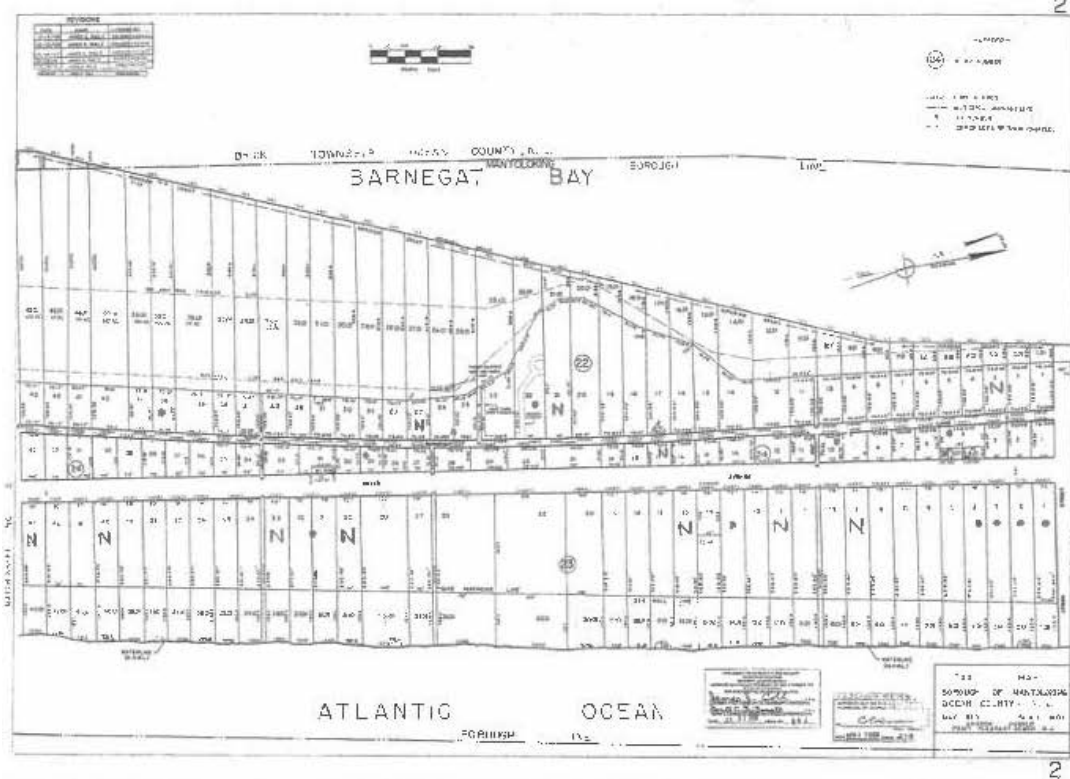


Figure 10: Lyman Street South toward Herbert (as of October 2019)

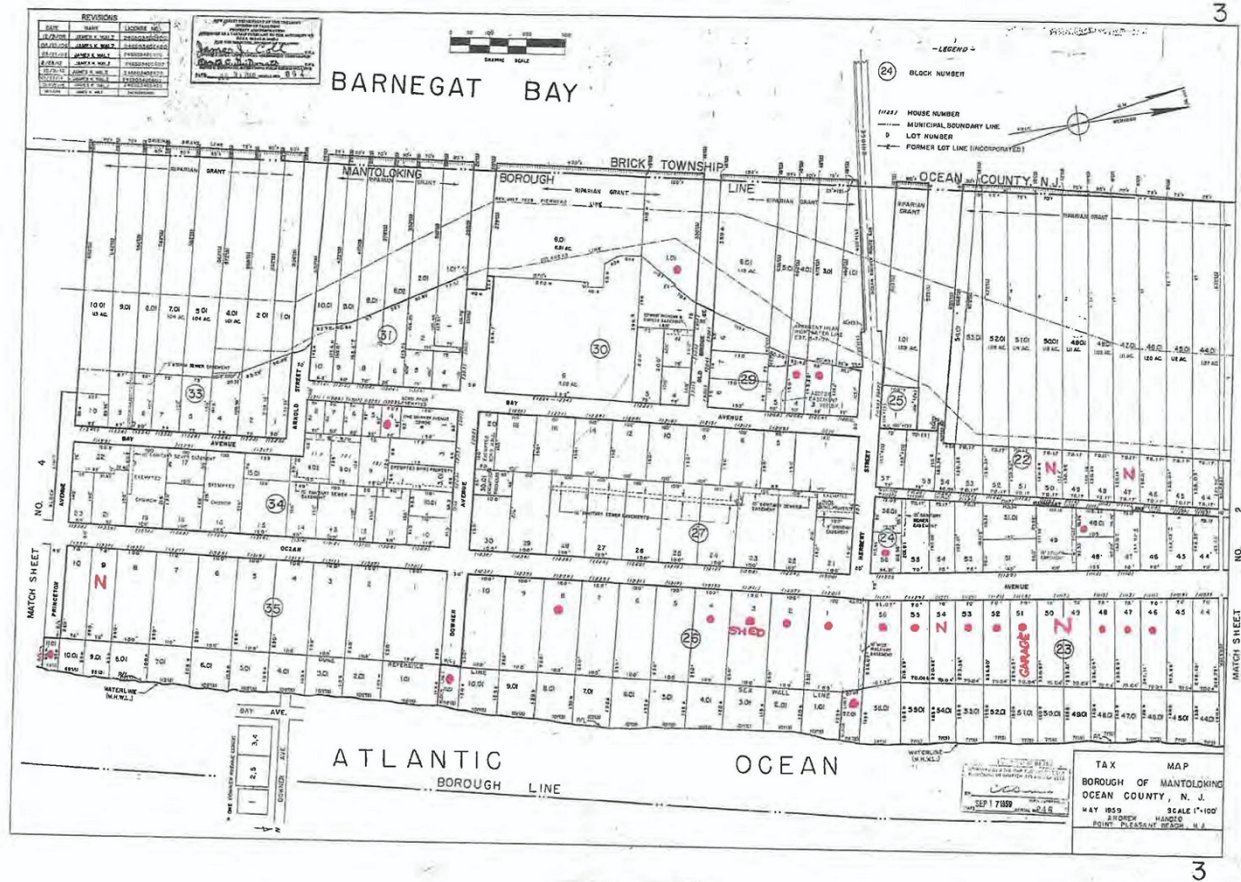


Figure 11: North of Herbert south to Princeton (as of October 2019)

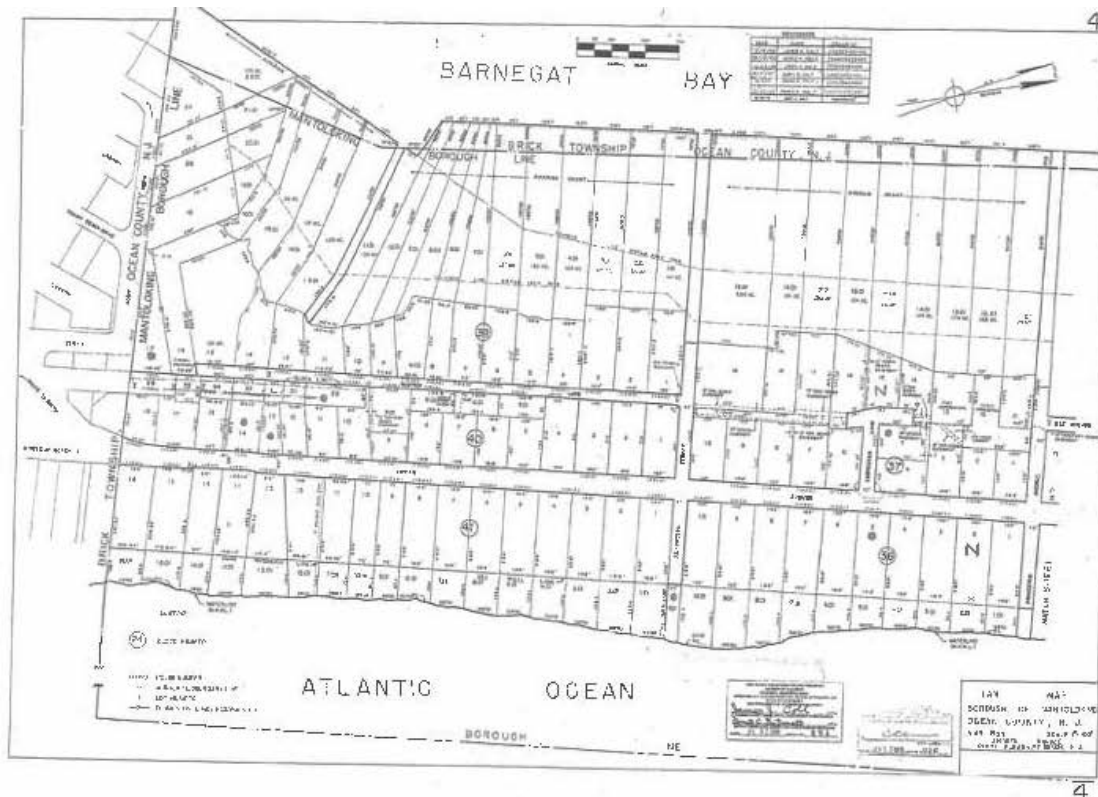


Figure 12: Princeton south to Brick Township (as of October 2019)

3.4 Roads

As of May 2010, the Borough had a total of 6.42 miles (10.33 km) of roadways, of which 4.00 miles (6.44 km) were maintained by the municipality, 0.25 miles (0.40 km) by Ocean County and 2.17 miles (3.49 km) by the [New Jersey Department of Transportation](#).^[5]

3.5 Utilities & Services

The Borough's public utility grid is municipality-wide and is available for all buildable parcels within Mantoloking, including public sanitary sewer. All new structures, including residential and commercial, are required to connect to the sanitary sewer system. The potable water and fire suppression water is supplied by a private utility company, New Jersey American Water Company (NJAW). The utility purveyors for natural gas and electric are New Jersey Natural Gas (NJNG) and Jersey Central Power and Light (JCP&L), respectively. All public utilities are located throughout the municipality.

3.5.1 Sanitary Sewer

The sanitary sewerage collection system, completed in the late 1970's, is adequate for the long range needs of the Borough. The sanitary sewer pumping station located at 5 Herbert Street (Block 27, Lot 21.01) was completed destroyed by Superstorm Sandy, as the pumping station was located directly within one of the above mentioned breaches between the Barnegat Bay and the Atlantic Ocean. With funding from FEMA, the Borough rebuilt the sanitary sewer pumping station in 2015 within the same location. However, the reconstructed sanitary sewer pumping station was rebuilt with storm hardening improvements, including a deep pile foundation; elevated building with emergency generator, Supervisory control and data acquisition (SCADA), and the electrical/pump control components; submersible pumps; and

strapping for the chemical feed tank. The original subsurface dry well chamber which contained the sanitary sewer pumps has been decommissioned and eliminated with the newly reconstructed storm hardened facility. The elevated structure also contains an emergency backup generator receptacle for additional redundancy, in the event the gas supplied backup generator in the building is compromised.

The pumping station is remotely monitored by the Brick Township Municipal Utilities Authority (BTMUA) at their headquarters with SCADA. With an Inter-Local Agreement, the BTMUA provides maintenance for the Borough for the sanitary sewer collection and conveyance system, and is the licensed sewer operator.

The Borough's wastewater is collected with PVC sanitary sewer mains located within both public rights-of-way and permanent utility easements. All wastewater is collected and conveyed to the one (1) pumping station within the Borough located on Herbert Street across from the intersection of Barnegat Lane. The pumping station conveys the municipal wastewater within a 10" diameter ductile iron pipe force main through the public rights-of-way and easements within or near Herbert Street, Bay Avenue, Carpenter Lane, Albertson Street, and Runyon Lane, and the sanitary force main connects to a manhole near the municipal boundary line with Brick Township. A bypass connection manhole was also recently constructed at the Herbert Street Pump Station Facility to allow for bypass pumping into the 10" force main in the event of an emergency or for future pump station repairs. The downstream conveyance and treatment agency for the municipal wastewater is the Ocean County Utilities Authority (OCUA) with final treatment at the OCUA Central Water Pollution Control Facility in Berkeley Township, which began operations in November 1979. (See <http://www.planning.co.ocean.nj.us/frmMaps>)

The sanitary sewer collection system is located within a flood hazard area. To eliminate infiltration and Inflow (I&I) from stormwater and floodwater, the sanitary sewer manholes have watertight covers. With the elimination of vent holes on the manhole covers, the sanitary sewer system is vented with above-grade pipes located within the public rights-of-way. All new outdoor showers being developed or reconstructed within the municipality are not to be connected to the sanitary sewer system to eliminate I&I. All outdoor showers being constructed or redeveloped within the Borough are required to have drains located above the Design Flood Elevation (DFE), which is the Base Flood Elevation (BFE) plus one (1) foot of freeboard, and the shower drains shall be protected from stormwater by a roof and walls.[13]

3.5.2 Power

Power is supplied to Mantoloking by Jersey Central Power and Light (JCP&L). There is one large 34.5 Kilovolt loop providing power to the entire Island Beach peninsula. Power is fed from the Mantoloking sub station (next to 1550 Ocean Ave.) and the Ocean Beach sub-station. This provides redundancy. If one sub-station is lost, through switching, JCP&L can back feed power using the other feed. JCP&L has mobile sub-stations on the mainland that allows them to replace any sub-station within hours in case of power loss. This provides reliability of more than 99%. In addition, JCP&L has added a Hesco system, a 4' square container filled with sand 4' high. During storms, they can close the gate to provide additional protection against flooding. There are several options for reporting your outage: call the Outage Reporting Line at 1-888-LIGHTSS (1-888-544-4877); report at www.firstenergycorp.com; or, Text OUT to 544487 (LIGHTS).[10]

3.5.3 Natural Gas

The Borough is currently supplied natural gas by New Jersey Natural Gas Company (NJNG) through a network of gas mains receiving their supply from both the northern and southern ends of the Seaside Peninsula as well as from the mainland across Barnegat Bay in Brick Township. By having multiple feeds, continued safe, efficient and economical service can be maintained to the Borough as well as the remainder of the Island Beach peninsula.

Through its “NJ RISE” program, NJNG has constructed improvements to increase resiliency and redundancy of the natural gas system. This includes projects such as two new gas main feeds across Barnegat Bay; one is the Beaton Boat Yard (Brick) to Arnold St. project; the other serves the southern portion of the peninsula, and runs from Berkeley to Seaside Park. NJNG has also performed storm hardening of critical facilities such as regulator stations, as well as the installation of Excess Flow Valves (EFV) on residential and commercial services in flood-prone areas.[19]

3.5.4 Water

Initially, potable water was supplied by an artesian well sunk 780 feet deep. A wind mill and tank were raised to provide adequate pressure. This was destroyed in a 1894 storm and a larger windmill and tank were built, as well as an additional well was dug to a depth of 922 feet in 1901.

Currently, potable water is supplied by the New Jersey American Water Company (NJAW). NJAW, has a booster pumping station located on the corner of Bay Avenue and Arnold Street (Block 34, Lots 5, 6, 7, and 8) that has been used to ensure adequate water pressure flows for their franchise area, but is no longer in use. The Borough of Mantoloking provides an annual fee to NJAW for each of the fire hydrants located within the municipality for the fire suppression system. Reliance upon water from aquifers for fire protection has been essentially eliminated.

The primary NJAW water supply emanates from the Jumping Brook surface water treatment plant. This is supplied by the Manasquan Reservoir, Shark River tributaries, and rain water. In the summer months when there is increased demand, the water supply is supplemented from wells in Bay Head. These wells obtain water from the Potomac Raritan, Magothy and Englishtown aquifers.

NJAW creates an annual report and posts it at amwater.com. The state tests water quality almost every day throughout the supply chain. It starts with the raw water at the source; it is then tested after treatment in the surface water treatment plant. It is also tested throughout the delivery system. There are sampling stations along Island Beach. The Mantoloking test station is near Rt. 35 & Downer St. It is tested once per month, although other areas of Island Beach are tested periodically, so on average they are tested once per week. The tests include checking for levels of chlorine, bacteria, and pH.[9]

3.5.5 Storm Sewer System

The municipal storm sewer system consists of solid wall collection piping with outfalls located within South Lagoon and the Barnegat Bay. Several storm sewer cross drains along East Avenue are operating as inverted siphons or depressed sewers with discharges from the downstream inlet grates on the west side of the roadway and continued stormwater gutter flows toward New Jersey Department of Transportation (NJDOT) Route 35. The storm sewer system requires annual inspection and cleaning by the DPW. The Borough reports to the NJDEP the maintenance work performed on the storm sewer system, including cleaning, under the Tier A

Municipal Stormwater General Permit with the filing of the Annual Report and Certification. The Borough has installed check valves on six (6) storm sewer outfalls to act as a backflow preventer to reduce the frequent roadway flooding. The check valves are currently located on outfalls from Bay Avenue, Arnold Street, Old Bridge Street, Bergen Avenue, Lagoon Lane North, and Channel Lane.

3.5.6 Storm Water Management

The Borough of Mantoloking has ordinances to control the discharge of stormwater runoff from lots within the municipality to address any negative impacts downstream and off-site of the subject lots. In Chapter 30 – Land Use Regulations, the Borough requires all development to comply with design standards for run-off volumes and rates with a Surface Water Management Plan. Also, under Chapter 18 – Stormwater Management and Control, all Major Developments, as defined by the disturbance of more than 1 acre or with the creation of more than ¼ acre of new impervious surfaces, must comply with design standards for stormwater runoff volume, quality, and groundwater recharge, which is based on the similar standards promulgated by the State of New Jersey under N.J.A.C. 7:8 – Stormwater Management.

The stormwater management system within the Borough is constrained by flat topography, a high groundwater table, and surface water elevations within the Barnegat Bay, South Lagoon, and North Lagoon. The discharge of stormwater is limited to the western side of the municipality, as discharge to the Atlantic Ocean is logistically challenging and highly problematic. The rate of stormwater discharge from the municipal separate storm sewer system (MS4) to the surface waters of the lagoons and Barnegat Bay is controlled by the tailwater effect on the submerged storm sewer outfalls. The typical stormwater discharge from the MS4 is under a head pressure condition and not an open free discharge. The attempt to implement recharge Best Management Practices (BMPs) are limited by the high groundwater table. The Borough has not implemented stormwater pumping stations due to concerns for backup power generators; compliance with flood code for elevating components above the Design Flood Elevations (DFE); operating expenses; long-term maintenance and repairs; and lack of overflow discharge in the event of a pump failure.[13]

Post Superstorm Sandy, the NJDOT completely rebuilt Route 35 with a new stone-and-asphalt roadway, providing a more stable road and smoother driving surface. The project replaced the old roadway that was eight-inch thick concrete slabs that were more susceptible to damage from a major storm. The project also included a new stormwater drainage system for Route 35 designed to handle 25-year storms and features pump stations (two in Mantoloking, one at the west end of Lyman and the other at the west end of Downer), and treatment facilities to filter and purify the storm water prior to discharge into Barnegat Bay. The NJDOT had made an effort to seal leaks in this system, but some remain and the pumps frequently pump collected ground water into Barnegat Bay. Further, generators were not included in the plans, so external generators are in place in case of a power outage.

3.6 Open Space, Parks, Recreation

Mantoloking is a typical beach barrier community bounded in the east by the Atlantic Ocean and in the west by Barnegat Bay. Borough owned open space includes the eastern street ends, and the Barnegat Bay side street ends at Albertson, Princeton, Arnold, Old Bridge St., Lyman, and limited access at Bergen. There is a small parcel of landscaped open space to the west of the newly constructed Borough Hall.

Recreational opportunities are primarily bathing and boating. The Beach and Riparian Grant parcels are zoned as “OS” or Open Space. The Zoning Ordinance does not permit any structures to be constructed in the OS Zone.[13]

There are no formal parks due to the fully developed nature of the community, although the Patty Brand native garden is located on the water at Bergen. Mantoloking Yacht Club is private, but provides open space for its sailing and other recreational activities.

3.7 Ocean and Bay Access

Mantoloking provides access to the ocean beach at 14 points distributed throughout the town. They are at Carrigan, Williams, Newman, Stephens, Lyman, 1039 Ocean, 1071 Ocean, 1085 Ocean, 1107 Ocean, Herbert, Downer, Princeton, Albertson, and 1539 Ocean. The access point at Downer Ave is American Disabilities Act (ADA) compliant.

Public access to the Bay is provided at the Bay Borough-owned street ends (Princeton, Arnold, Old Bridge and Lyman), Bergen (Channel Lane beach), and at the MYC north dock off Old Bridge St.

4. Natural Resources

4.1 Topography and Geography

The Borough of Mantoloking is located entirely within the Coastal Plain physiographic province of New Jersey. The topography is generally flat to gently undulating. However, erosion-resistant gravel or iron-cemented sediment underlie upland areas and isolated hills. The sediments consist of layers of sand, silt, and clay deposited alternately as sea level fluctuated. Wide areas of the Coastal Plain are covered by a thin veneer sand and gravel deposited by rivers. The shallow water of coastal plains allows for a gentle, less turbulent interrelationship between land and sea, resulting in the accumulation of sand along the shoreline.[6]

Mantoloking’s surface features, such as dunes, hills, swales and low areas, have been considerably altered over the years as the area developed. The highest elevation in the borough is located along the crest of the dune system at approximately 22 feet (NAVD 1988) above sea level. The lowest elevation of 0 feet (NAVD 1988) is located along waterfront borough boundaries.

Figure 13 depicts the results of a study performed to show shoreline changes from 1839 – 1975. Although there are significant changes depicted further south in Ocean County, little change was determined to have taken place in Mantoloking. There is a general trend for the land to be moving westward.

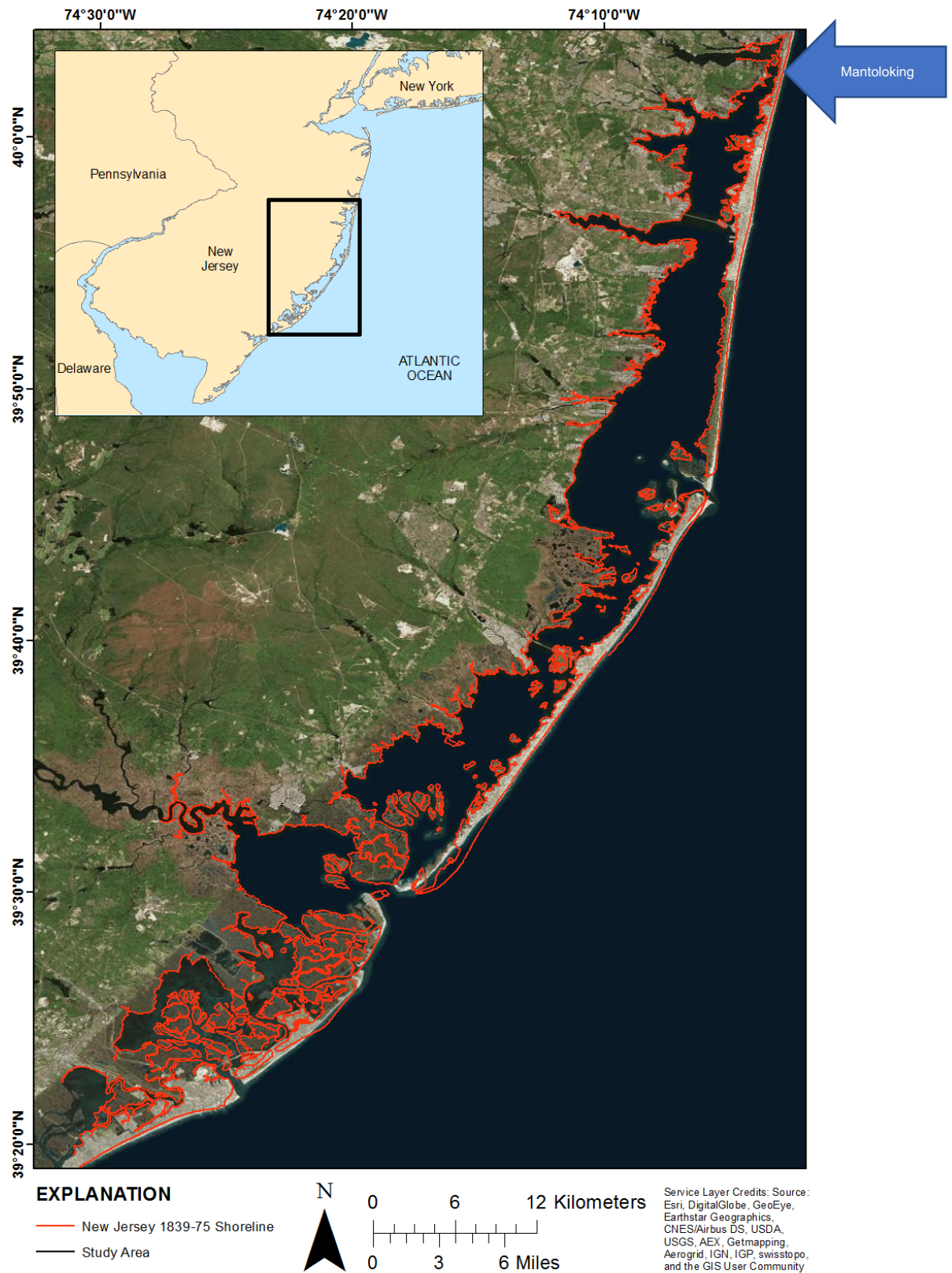


Figure 13: 1839 – 1975 Shoreline Change Map [16]

4.2 Beach

The most valued aspect of Mantoloking is its beach. Residents and non-residents alike enjoy the ocean shoreline in all seasons. The US Army Corps of Engineers (USACE) Beach Replenishment project was implemented in Mantoloking in 2017-2018 to restore the beach after Superstorm Sandy. This project constructed 22-foot high dunes, with a 25'-wide crest, with a post construction berm 300' wide, intended to evolve to a designed 75' berm. Dune fences were installed to the east and the west to prevent people from walking on the dune. Dune grass was planted to protect it as well as gather additional sand.

Starting in 2019, the Borough provided life guard protection at Lyman and Downer every day, and at Albertson on weekends, from June 15 – Labor Day. Seasonal beach badges cost \$85 and daily badges cost \$25 to help defray the costs. The Department of Public Works (DPW) supervised cleaning of the beach and residents have been pleased with the result.

4.3 Watershed Management Area

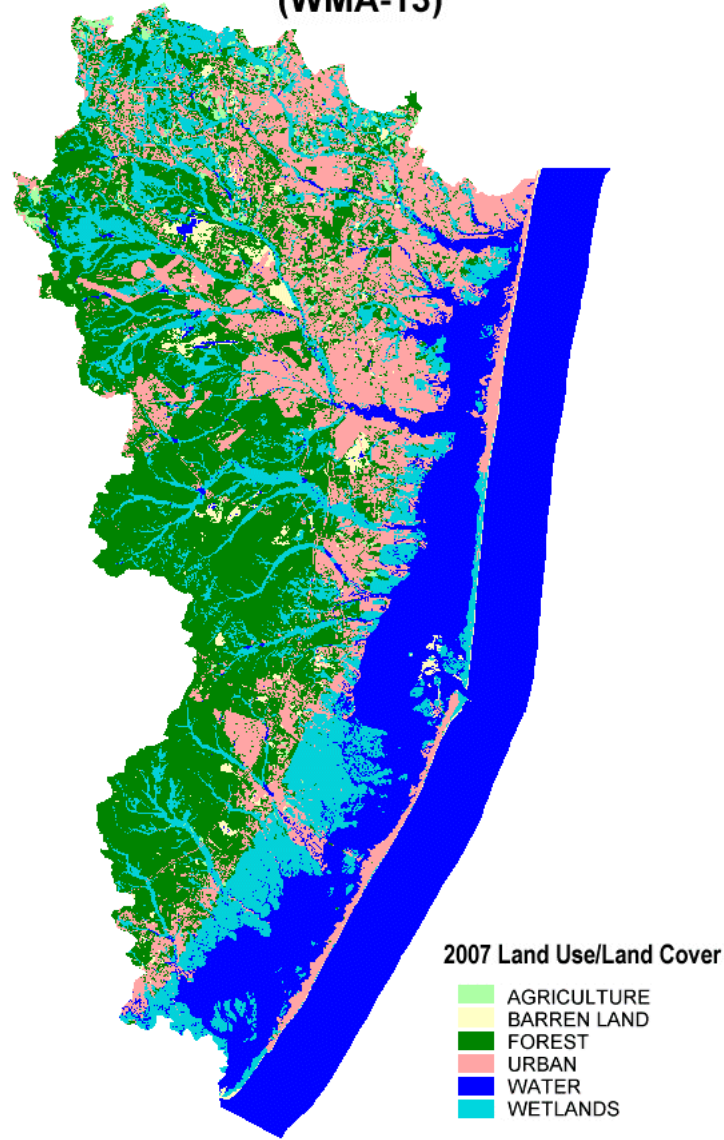
Mantoloking is located in NJDEP Watershed Management Area (WMA)13 – Barnegat Bay. WMA 13 covers all of Ocean County. Table 4 details the composition of WMA 13.

Table 4: Watershed Management Area 13: BARNEGAT BAY (In Acres)[8]

| Land Use Type | 1995 | 2002 | Net Change |
|---------------|---------|---------|------------|
| Agriculture | 5,305 | 4,579 | -727 |
| Barren Land | 9,206 | 8,938 | -268 |
| Forest | 156,860 | 147,438 | -9,423 |
| Urban Land | 87,846 | 99,394 | 11,548 |
| Water | 158,812 | 158,520 | -292 |
| Wetlands | 90,218 | 89,380 | -839 |

As can be seen in Figure 14, Mantoloking is categorized as primarily urban. The only area designated as wetlands is Herring Island.

Barnegat Bay Watershed Management Area (WMA-13)



For purposes of this display, the land use data have been generalized from over 70 detailed Level III/IV categories to 6 Level I categories. The actual data set does contain all of the generalized categories and delineations.

Figure 14: Barnegat Bay Watershed Map [15]

4.4 Soils/Soils History

The United States Department of Agriculture has the responsibility to evaluate and classify all soils in the United States. This classification is based on standards of the physical and biological make-up of the soil profile. In New Jersey this task has been performed by the New Jersey Soil Service and the County Soil Conservation Services. The information is published by the county and includes detailed soil descriptions and soil maps.[16]



Figure 15: Mantoloking Soil Map

As can be seen in Figure 15, the primary soil type along the beach is BEADV. This is the dune area that is frequently flooded. Just west of the dune area, approximately between Rt. 35 and the dunes, the soil is classified as type Urban land-Hooksan complex. This is composed of

Urban land (65%); similar soils(20%); minor components(15%). West of Rt. 35 to the Bay shore, the soil consists of Psammaquents (PstAt), sulfidic substratum, frequently flooded, & similar soils(85%); and minor components(15%) The Bay bottom soil type varies, but it is interesting to note that there is a soil type named specifically after Mantoloking, WMA1, that appears off Dale's Point and Curtis Point.

The soil, except for the dune areas, is generally of poor weight bearing characteristics comprised largely of sandy fill placed over perpetually unstable subsoil. Surface water drains, for the largest part, into Barnegat Bay. All marsh lands have been filled and woodlands, if any, have been reduced to heavy brush on the few remaining undeveloped lands.[13]

4.5 Climate[5]

New Jersey has five distinct climate regions influenced by geology, distance from the Atlantic Ocean and prevailing atmospheric flow patterns. The five climate zones are the Northern, Central, Pine Barrens, Southwest and Coastal. Mantoloking is located entirely within the Coastal Climate zone.

In the Coastal Climate Zone, the juxtaposition of land and sea constantly affect the weather. In autumn and early winter, when the ocean is warmer than the land surface, the Coastal Zone will experience warmer temperatures than interior regions of the state. In the spring and summer months, ocean breezes keep temperatures along the coast cooler. Being adjacent to the Atlantic Ocean, with its high heat capacity (compared to land), seasonal temperature fluctuations tend to be more gradual and less prone to extremes.

Sea breezes play a major role in coastal climate. When the land is warmed by the sun, heated air rises, allowing cooler air at the ocean surface to spread inland. In Mantoloking, people living within three to four blocks of the Ocean, are well aware of this temperature and wind pattern. The sea breeze reduces the need for air conditioning.

Coastal storms, often characterized as nor'easters, are most frequent between October and April. These storms bring strong winds, heavy ocean swells, and heavy rains. Tropical storms and hurricanes are also a special concern along the coast. In some years, they contribute a significant amount to the precipitation totals of the region. Damage during times of high tide can be severe when tropical storms or nor'easters affect the region. New Jersey averages about 45 inches of rain a year.

The last freezing temperature in the spring occurs prior to April 22nd (90% of the time). The first freezing temperature in the fall is before November 13th (90% of the time). These dates result in a growing period of 183 days above 32° F.

Table 5: 1981 - 2010 monthly climatic averages for Mantoloking Beach, Ocean County, New Jersey.

| Twp | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Ann |
|---------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Avg High Temp | 40 ° F | 43 ° F | 49 ° F | 59 ° F | 69 ° F | 78 ° F | 83 ° F | 82 ° F | 76 ° F | 65 ° F | 55 ° F | 45 ° F | 62 ° F |
| Avg Low Temp | 25 ° F | 27 ° F | 33 ° F | 42 ° F | 51 ° F | 61 ° F | 67 ° F | 66 ° F | 59 ° F | 47 ° F | 39 ° F | 30 ° F | 46 ° F |

| | | | | | | | | | | | | | |
|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Avg Dew Point | 22 ° F | 23 ° F | 29 ° F | 38 ° F | 49 ° F | 59 ° F | 64 ° F | 64 ° F | 58 ° F | 47 ° F | 37 ° F | 27 ° F | 43 ° F |
| Avg Precip | 3.7" | 3.1" | 4.2" | 4.0" | 3.5" | 3.7" | 4.6" | 4.5" | 3.5" | 3.8" | 3.9" | 4.0" | 46.5" |
| Estimated Average Seasonal Snowfall (Nov - Apr) ≈ 19" | | | | | | | | | | | | | |

Table 6: Dew Point / Humidity Chart

| Dew Point | Humidity |
|---------------|-------------|
| ≥ 75 °F | Extreme |
| 70 °F - 74 °F | High |
| 65 °F - 69 °F | Moderate |
| 60 °F - 64 °F | Slight |
| ≤ 59 °F | Comfortable |

4.6 Hydrology/Water

As depicted in the map at: state.nj.us/dep/njgs/pricelst/gmseries/gms13-1.pdf, there is a well in Mantoloking that goes down 1453 feet to the Magothy aquifer. The Magothy aquifer consists of fine-to-coarse sand interstratified with dark, carbonaceous clay. It is a thick, continuous aquifer in Monmouth and Ocean counties. In the NJ Coastal Plain, the Magothy aquifer is thickest in Monmouth County where it exceeds 200 feet along the coast. It is correlative with the Upper Aquifer of the Potomac-Raritan-Magothy aquifer system, and the Magothy Formation. The Magothy Formation includes several informal members including the Cliffwood and Morgan Beds, Amboy Stoneware Clay, Old Bridge Sand, and South Amboy Fire Clay. The Magothy aquifer is primarily equivalent to the Old Bridge Sand (Zapeczka, 1989), and may include the Sayreville Sand Member of the Raritan Formation. Cross sections from the map show the thickness of the Magothy, the most productive aquifer of Monmouth County.

The National Weather Service provides an advanced hydrologic prediction service at the following site: <https://water.weather.gov/ahps2/hydrograph.php?wfo=phi&gage=mtln4>

4.7 Flood Prone Areas

As Mantoloking is built on a barrier beach and is fundamentally a low lying area, some flooding is expected. Over the years, the Borough has remediated flooding issues primarily due to flooding from the Bay in strong southwest winds. Incrementally, and as possible without flooding individual properties, the Borough has raised the level of the roads, where feasible. For example, some road beds were raised as part of the sewer project in 1975. Old Bridge St. has been raised to reduce the flooding in high tides or heavy rains. Bay Ave just north of Princeton has recently (2017) been addressed. The Borough received (April 2019) a grant to reduce flooding in the north end of Barnegat Lane. The Rt. 35 storm water management project seems to have reduced bayside street flooding, but pumping water from streets into the Bay is futile if/when the water levels are the same. In the long run, with climate change and consequent water level rise, Borough streets will be flooded more and more often.

4.8 Wetlands

There are no wetlands remaining; they have been eliminated by development. However, there are environmentally sensitive areas in and near Mantoloking that can be viewed at: [ArcGIS NJDEP Boater Bay Map](#). The areas include preserved lands including Herring Island, the parks and marinas on the west side of the Mantoloking Bridge, and Swan Point and the marshes behind it.

4.9 Air Quality

New Jersey's air continues to be among the most polluted in the nation. Much of the Jersey Shore and the South Jersey counties received failing grades in a study over a three-year period from 2014-2016. Ozone is increasing, but soot is decreasing. In fact, Ocean County received a passing grade for soot starting in 2012. The NJDEP has an Air Quality department and maintains a web site with information and current air quality levels at: <https://www.nj.gov/dep/daq/>.

5. Biological Resources

5.1 Hardiness Zone

The USDA Plant Hardiness zone for the Mantoloking Area is 7A. This designation is based on the most recent temperature data available from 2012. Zone 7 has a medium length growing season, with a last frost date of April 15th and first frost date of November 15th. More information is available at <https://planthardiness.ars.usda.gov/PHZMWeb/>

5.2 Dunes

In the early 1800's Mantoloking was uninhabited and environmentally pristine. Vegetation was random on the dunes, relying on the wind and wildlife to carry the seeds to a new location. Grasses and plants helped capture the sand while the root systems anchored the dunes. On the bay side, salt grasses helped hold the silt therefore building and extending the barrier island westward. Left to the give and take of Nature's devices, this barrier island served as protection and a barrier for the mainland.

The vegetation on the foredunes (primary) had to withstand salt spray, winds, wash over and storm surges from the ocean. Grasses and low growing plants that could, survived. On the back dune (secondary dune), the vegetation was more protected and became denser and the plants tended to be taller and more established over time. The dune growth was subjected to wind, plants, storms, and seasonality. Plants and location of plants were random and unplanned relying on wind and wildlife to carry the seeds.

On the foredune and dune crest, American Beachgrass (*Ammophila breviligulata*), with its underground rhizomes that thrive under adverse conditions of shifting sands and high winds, provides stability to the dunes. Little Blue Stream (*Schizachyrium scoparium*) offers a cool green feathery grass which turns bronze orange in the fall.

In 1885, an article in the Snipe, Mantoloking's weekly newspaper, described the flora on the beach. Nestled amongst the grasses were the following: Beach Rose (*Rosa rugosa*), Yellow Primrose (*Primula*), Marsh Mallow (*Althaea officinalis*), Coastal Iris (*Iris prismatica*), Wild Rose Vie (*Rosa setigera*), Beach Pea (*Lathyrus japonicus*), Butterfly Weed (*Asclepios tuberosa*), Cardinal Flower (*Lobelia cardinalis*), Asters (*Symphyotrichum novae angliae*), Oxeye Daisy (*Leucanthemum vulgare*), and Black-eyed Susan (*Rudbeckia hirta*). All of these are original

native plants found hidden in the dunes. In addition to this flora and the grasses, other natives thrived in the dunes by meeting the requirements of the environment. Seabeach Amaranth, is a low growing spreading plant with reddish stems and leaves that look like spinach. It grows in sand on the foredune and regeneration is spread by its' seeds. Recently, it has re-established itself in the berm of the replenished dunes.

On the dune crest, it was common to find seaside goldenrod (*Solidago sempervirens*) and Dusty Miller (*Artemisia stelleriana*).

On the back dune, away from the ocean, the vegetation included taller bushes and trees such as Beach Plum (*Prunus maritima*), Northern Bayberry (*Morella pensylvanica*), American Holly (*Ilex opaca*), and Winged Sumac (*Rhus copallium*).

In 1875, the westward side of the dunes were covered with grasses and Winged Sumac, Bayberry, Seaside Goldenrod, Cat Brier (*Smilax rotundifolia*), and Poison Ivy (*Toxicodendron diversilobum*).

All the vegetation found on the barrier island was truly native. Native plants have existed since the last ice age in their area and thrived because they have acclimated themselves to the existing conditions over centuries along with the insects, birds, and wildlife. They are all codependent in the perfect balance of working together to survive. Wildlife, birds, and insects draw pollen from native plants they instinctively recognize and pollinate which provides the means for bearing fruit. Birds and wildlife eat the fruits and dispersing the seeds spreading new growth.

Green plants and trees were and are important to the human environment, forming the basis for sustainability and long term health of environmental systems. They remove carbon dioxide from the atmosphere and generate oxygen, a requirement for life.

5.3 Marshes

It was an accepted practice for farmers to ferry their cattle to graze on the barrier island for the winter. The marshes, rich in organic nutrients, were a major food source and offered protection for wildlife. Harvesting the Salt Hay became a valuable crop for cattle feed and for natural bedding, and was an unfailing source of feed for winter use. Salt hay was also used as insulation in ice houses, packing material for bricks, pottery and glassware and to manufacture heavy brown butcher paper. The grasses were: Yellow Salt Grass (*Spartina patens* which is a perennial spreading grass that mats in the high salt marsh and is a finer quality and best for salt hay); Black Grass (*Juncus gerardii* which grew in the upper edges of salt marshes was favored as silage to feed cattle during the winter); Three Square Grass (*Scirpus olneyi* which has a vigorous root system and slowly added to the height of the elevation of the salt marsh... it also provided conditions favorable for the growth of the Yellow Salt Hay); Salt Marsh Cordgrass (*Spartina alterniflora* which grew in the low salt marshes that flood regularly with the tidal flow, but was difficult to harvest). Salt marshes served as pollution filters, a buffer against flooding and shoreline erosion. From the various grasses, the marsh builds into solid ground as a result of the root base of these grasses. A barrier island naturally builds and moves westward. Without any disruption and interference from man, eventually the barrier island would attach to the mainland.

5.4 Bay

Mantoloking is bordered on the west side by Barnegat Bay which had extensive salt marshes along the brackish coastline. Brackish water is a mix of mostly salt water from the ocean's natural

inlets and the fresh water from mainland's rivers. Both converged into Barnegat Bay forming a unique body of water rich in nutrients for plants and an ecosystem that supported marine life. In the Bay especially near inlets where the water had a higher saline content, there is eelgrass (*Zostera marina*) which is thin ribbon like up to 2' high and ¾" wide. It forms dense beds in the east side of the Bay. This area was susceptible to rising sea levels and storm erosion. Storm surges from the ocean would carry sand and deposit it on the marshes and create a sandy bottom along the shallows. Eelgrass plants would shed and wash up on the shore line. The dried eelgrass was raked and harvested for stuffing upholstered furniture, backed with paper provided insulation in buildings, and was stuffed in mattresses. In areas where there was more fresh water than salt water you would find Widgeon grass (*Ruppia maritima*). These underwater grasses created a safe haven for worms, clams, baitfish and small fish that were harvested by the baymen and were fine dining for migrating waterfowl.

5.5 Native Plants

Superstorm Sandy caused a tremendous loss of native trees and plants, whose deeper root systems better absorb water during rainstorms. The effect of this in Mantoloking has been:

- increased flooding on local streets and in yards
- decreased number of native birds, butterflies, and insects that assist in pollinating native plants.

On a barrier island, it is extremely important to replant vegetation that can naturally grow in this salt water environment. Grass, on the other hand, has very shallow roots, absorbs minimal rainwater, and the fertilizers commonly used for grass are harmful to Barnegat Bay! This needs to be addressed going forward with all the new construction in town.

See www.Jerseyyards.org for ideas for native landscaping.

5.6 Animal Communities/Threatened and Endangered Wildlife

Mantoloking has abundant wildlife. Foxes are seen nesting in the dunes, hunting on the streets and along the Bay.



Courtesy of Peter Chance

Deer have been seen in town, arriving here by swimming across the Bay near the bridge.

The Common Snapping turtle is not endangered and does not require any kind of permit to be possessed in NJ; however they cannot be taken from the wild. A 12" snapping turtle was found on Bay and Downer Avenues during the summer of 2019.



Courtesy of Jan O'Malley

Rabbits and squirrels are abundant and are an attraction to the foxes. Racoons, opossums and ground hogs are primarily night creatures that feed on gardens and unsecured garbage.

Ospreys have recovered from near extinction by DDT and have almost become a nuisance while roosting on sailboat masts and boats.

Birds and butterflies frequent yards that have native and non-native plantings.



Orange Sulfur butterfly on Seaside Goldenrod

Courtesy of Save Barnegat Bay

The Natural Heritage Priority Sites was created to identify critically important areas to conserve New Jersey's biological diversity, with particular emphasis on rare plant species and ecological communities. Natural Heritage Priority Sites are based on analysis of information in the New Jersey Natural Heritage Database. However, these sites do not cover all the known habitat for endangered and threatened species in New Jersey. Using the Natural Heritage Database, the Office of Natural Lands Management (ONLM) has identified 343 Natural Heritage Priority Sites, representing some of the best remaining habitat for rare species and rare ecological communities in the state. In addition to locating specific sites, the program developed a grid system that lists rare and endangered plant species present within the grid.[12] Mantoloking has two of these threatened or endangered species:

- Piping Plovers. The piping plover (*Charadrius melodus*), named for its melodic mating call, is a small, pale-colored North American shorebird. The bird's light sand-colored

plumage blends in with the sandy beaches and shorelines which are its primary habitat. The piping plover first received protection under the Endangered Species Act (ESA) in 1985. Piping plovers nesting along the Atlantic Coasts are listed as threatened. Areas of Mantoloking dunes have been fenced off to protect piping plover nesting sites.

- Seabeach Amaranth. This plant disappeared from NJ beaches in 1919 and did not appear again until 2000. Seabeach amaranth was federally listed as a threatened species in 1993. It is possible some seeds survived over the years underwater and were returned with the beach replenishment sand from offshore. Seabeach Amaranth was found on the beach foreshore just north of Downer Ave during the summer of 2018 and has been roped off for protection. It has been washed away by Nor'Easters in the fall of 2019.



Seabeach Amaranth in Mantoloking
Courtesy of Save Barnegat Bay

6. Recommendations

6.1 ERI and Master Plan

Recommendation 6.1.1: The ERI should be incorporated as a chapter in the Master Plan and/or a re-examination report when either is next updated. The Borough adopted a Master Plan Re-examination report in 2017. Until the next update, the MEC recommends that the Planning Board utilize this ERI as a resource as though it has already been incorporated into the Master Plan.

Recommendation 6.1.2: Per NJ Code Title 40:55D-27b, the Planning Board should forward to the MEC chair an informational copy of every application to the Planning Board to provide an opportunity for environmental review and comment.

6.2 Climate Change

The primary long-term threat to Mantoloking is climate change. According to a recent report[21], Mantoloking is predicted to be underwater with 95% probability by 2100. Since 1980 New Jersey has begun to experience more rapid warming, with five of the warmest years occurring after 1998. 2012 was the warmest year on record for New Jersey, with an average temperature that was 2.8°F above the 1981-2010 mean. It has been predicted that by 2050 the New Jersey sea level will be about 1.4 feet higher than in 2019.

The Federal Emergency Management Agency (FEMA) provides a map service center at <https://msc.fema.gov/portal/home> which provides access to the required elevations for building in flood prone areas such as Mantoloking. Along the ocean front, most lots are in the VE zone that requires 12' of elevation. Along the Bay, most lots are in the AE zone which requires 9' of elevation. Elevations are specific to each area/lot in the Borough and can change with the adoption of new flood maps.

At an October 2019 SBB Conference, Charting a Course for Barnegat Bay, it was reported that temperature change is the foremost cause of sea-level rise, which is more rapid in the northeast than the global rate of 1.1-1.9 mm/year. Sea level has been rising at 4 mm/year along NJ coast since the beginning of the 20th Century. A large contribution to sea level rise is as a result of thermal expansion of water from temperature increase. This is estimated to be 0.5m per 1° C temperature increase. At the same time, coastal land is subsiding due to geological forces.

All of these factors increase the climate change risk to Mantoloking. The most obvious threat is rising sea level with resulting increased flooding. Less severe impacts include increased frequency of severe weather events, more rainfall, more insects, and death of trees and plants that are not sufficiently salt tolerant. Most reports state that we are beyond the tipping point of stopping climate change. But, according to [20], the good news is that:

“resilience investments can reduce current and future risk: These projections are not foregone conclusions. Future reductions in global emissions would substantially reduce these hazards in the second half of the century, but that alone will not be enough. Vulnerable communities can better prepare for floods and storm damage by linking planning, mitigation, and adaptation. Zoning can guide development away from at-risk areas. Existing structures can be protected through retrofitting.”

The Bureau of Climate Resilience Planning (BCRP), within the Climate and Flood Resilience Program, provides planning and technical support to New Jersey's communities to help them make informed decisions about climate resilience. New Jersey maintains a web site for tracking the issues and what can be done at <https://www.nj.gov/dep/climatechange/>

Recommendation 6.2.1: Reducing reliance on fossil fuels is a primary goal. The US, NJ, Mantoloking and residents should rely more wind and solar power generation; greater use of electric cars; reducing idling engines, and more thermal home heating. The NJ Department of Environmental Protection (NJ DEP) urges us to achieve a 100% carbon free renewable energy economy by 2050.

Recommendation 6.2.2: Per the NJDEP, Mantoloking should perform a climate change vulnerability assessment to determine what planning, mitigation and adaptation should be implemented for critical infrastructure when overlaid on projected 2050 sea levels and considering a Category 1 hurricane with those sea levels. One proposed flooding prevention

solution to be considered is a revetment along the Bay similar to that along the ocean, although there would be many obstacles to overcome.

Recommendation 6.2.3: The Borough should continue to monitor and maintain its dunes through the Dune & Beach Committee. This should include homeowner education and managing walks across, and platforms on top of the dunes.

6.3 Over Development/Open Space

Mantoloking is geographically constrained as well as being fully developed, with minimal remaining open space.

Recommendation 6.3.1: The Borough Council and Planning Board, in creating and enforcing regulations, should be consistently mindful of the need to protect and/or increase light, air and open space, thus attaining one of the goals of the land use law. This can be accomplished by avoiding the grant of variances or waivers for proposals that exceed permissible lot coverage, impervious surface, setbacks, building height and/or volume.

6.4 Bay Water Quality

Shellfish growth/gathering is restricted in the Bay waters north of the Mantoloking bridge; conditionally approved in the waters between the bridge and Swan Point; and approved south of Swan Point. The latter area has previously been used for clam farming and is currently in use for oyster aquaculture. (See <https://www.nj.gov/dep/landuse/eservices/webmappingtool.html> for a very instructive mapping tool that provides various layers to see different data.) Stinging jelly fish (bay nettles) have been on the increase. Recently, the rare Clinging Jelly fish, that has a painful sting that can cause debilitating pain and hospitalization, has been found in the Metedeconk River and northern Barnegat Bay. Reducing storm water runoff that includes phosphates and nitrates will, over time reduce these negative impacts. Research studies hypothesize that removal of jellyfish polyps from plastic bulkheads and floats is effective in reducing bay nettles. (See also sections 6.5 and 6.10.)

The US Geological Survey (USGS) did a study in 2014 on nitrogen and phosphorus in Barnegat Bay which quantifies the nutrient loads and identifies some effective management strategies, available at: <https://www.nj.gov/pinelands/science/pinesseries/Christine%20Wieben%20-%20Nitrogen%20and%20Phosphorus%20in%20the%20Barnegat%20Bay-Little%20Egg%20Harbor%20watershed%20-%20Sources%20and%20Loads.pdf>

Recommendation 6.4.1: The Borough should engage with the Berkeley Township Underwater Search and Rescue (BTUSAR) Squad (Rick Pullen, rp50cal@aol.com, (732) 266-4543) to participate in removal of bay nettle polyps from plastic bulkheads and jet-ski floats. This will significantly reduce propagation. (The MEC has engaged with BTUSAR in November 2019.)

Save Barnegat Bay (SBB) has done extensive research and education in this area, especially about not using fertilizers and choosing native gardens over lawns. SBB was instrumental in passing the NJ Fertilizer Law. In 2011, the New Jersey State Legislature passed a law establishing statewide fertilizer standards in an effort to protect our rivers, lakes, and bays from pollution caused by lawn chemicals. The law:

- Sets standards for fertilizer content;
- Restricts the amount of nitrogen used in a single application and the total amount used in a year;

- Sets limits for when and where lawn fertilizer can be applied by homeowners and landscape professionals; and
- Requires professional applicators to be trained and/or certified in proper fertilizer use.

See savebarnegatbay.org for more information.

Recommendation 6.4.2: The Borough should actively support and implement, at the state and local levels, legislative or administrative proposals designed to strengthen the regulatory scheme concerning fertilizers and pesticides.

6.5 Storm/Surface Water Management

The NJDOT had made an effort to seal leaks in its Rt. 35 Storm Water Management System, but some remain and the pumps frequently pump collected ground water into Barnegat Bay (approximately every 15 minutes when there has been no recent rainfall). This is an environmental concern, as the impact on ground water levels is unknown. Might it be causing salt water intrusion?

Recommendation 6.5.1: Study the environmental and other impact on soils due to removal of groundwater.

Recommendation 6.5.2: The Borough should partner with other similarly adversely affected communities on Island Beach to request that the NJDOT terminate the practice of pumping ground water into the Bay.

Recommendation 6.5.3: As part of its storm/surface water management approach and plan, the Borough should add an ordinance to require green infrastructure solution implementation for the Borough and residents, such as green roofs, rain gardens, rain barrels, and porous pavement.

Recommendation 6.5.4: Mantoloking should consider creating a “stormwater utility”, permitted by NJ S-1073, to create a revenue stream and incentives for developing this type of resilience. New NJ legislation is expected to be approved in the next year that will have new rules on green infrastructure requirements. This will have an added benefit of recharging aquifers. The MEC can assist with education about green infrastructure.

As more and more homeowners have added pools to their properties, discharge of pool water has become a problem. This chlorine-tainted water discharge is harmful to plantings and to Barnegat Bay.

Recommendation 6.5.5: Pool owners should not be permitted to allow water from their pools or pool covers to flow off their property or into the street. The Planning Board should also consider requiring salt water pool water instead of chemically treated fresh water. Further, requiring pool covers would conserve water by preventing evaporation. Another alternative is to require relying on natural biological processes to purify the water using aquatic plants native to our area, and thus act as part of the local ecosystem.

6.6 Plastic Pollution

A recent World Economic Forum report predicts if no corrective action is taken, that by 2050 there will be more plastic in the ocean than fish (by weight). They also state that this is a problem that can be fixed in one generation. In its October 2019 meeting, the MEC resolved unanimously to support the New Jersey Clean Communities “Choose to Reuse” Campaign and to request that the Borough Council encourage state lawmakers to approve a uniform statewide

law, which applies to all 565 municipalities in New Jersey, to phase out both paper and plastic single-use bags and transition to reusable bags.

Recommendation 6.6.1: The Borough should pass local ordinances to eliminate single use plastics, paper bags, and mylar balloons. The Association of New Jersey Environmental Commissions (ANJEC) provides some model ordinances. Improved recycling can also help.

6.7 Known Contamination Sites

The only known active contamination site is on the Borough owned lot at 1303 Bay Avenue (Block 34, Lot 4). This is being managed by the Borough with direct oversight from the New Jersey Department of Environmental Protection (NJDEP). The Borough removed a 550-gallon fuel oil underground storage tank (UST) and a 250-gallon gasoline UST at the site in 1989. Soil contamination was encountered during the UST closures and a discharge of petroleum product was reported to the NJDEP. During the time period when the USTs were removed, containers of pesticides that were stored at the site were also found to be leaking onto the ground. The Borough conducted remedial activities at the site that included the excavation and disposal of contaminated soils, the installation of groundwater monitoring wells, and the recovery and on-site treatment of contaminated groundwater for a limited time. Presently there is no active remediation system in operation at the site, and the groundwater treatment system was removed at some time in the past. The Bay Avenue property is presently used by the Borough's Department of Public Works (DPW) for the storage of equipment and materials. The existing monitoring wells are used to sample and test the groundwater for on-going monitoring, and once the Borough can demonstrate that the contamination is delineated to the satisfaction of the NJDEP and demonstrate a trend in the reduction of contaminant concentrations over time, the Borough could propose the establishment of a Classification Exception Area (CEA) for the Borough property. The NJDEP's purpose in establishing a CEA is to use the CEA as a public notification mechanism. CEAs are established in order to provide notice that the constituent standards for a given aquifer classification are not, or will not be, met in a localized area due to natural water quality or anthropogenic influences. Designated aquifer uses are suspended in the affected area for the term of the CEA. The intent of this action is to ensure that the uses of the aquifer are restricted until the groundwater standards are achieved. An established CEA will restrict the use of the groundwater within the boundaries of the CEA.

| Site ID | PI Number | PI Name | Address | Home Owner |
|---------|------------|--|--------------|------------|
| 68628 | G000025988 | MANTOLOKING BOROUGH DEPT OF PUBLIC WORKS | 1303 BAY AVE | No |

6.8 Artificial Light Pollution

Artificial lighting affects the environment in a number of ways, including energy usage, the materials used to produce lighting products, and light's impact on the nighttime sky. It also affects our quality of life. The Borough includes light requirements in its Land Use regulations in Section 30-4.11:

- No light source generated or initiated upon or from any lot within the Borough shall be placed or maintained so as to allow the glare or illumination thereof to constitute a nuisance to persons upon any other lot or any public area within the Borough.
- The emission of light with a measured level of strength or illumination greater than 0.5 maintained foot candles measured at any point along the lot boundary line at grade, or at

any higher elevation, shall be conclusive proof that the light source or sources in question constitute a nuisance in violation of this chapter.

Recommendation 6.8.1: The Borough must designate a Code Enforcement Officer (currently Colleen Malvaio) to enforce its regulations regarding light requirements. Recently, a new digital light meter, with the ability to read to 0.5 foot candles and with a backlight LCD display screen, was obtained for the Borough's use to enable enforcement through the Engineering Department.

Modern society requires outdoor lighting for a variety of needs, including safety and commerce. The International Dark Sky Association (IDA) recognizes this, but advocates that any required lighting be used wisely. To minimize the harmful effects of light pollution, the IDA states that artificial lighting should:

- Only be on when required
- Only light the area that needs it
- Be no brighter than necessary
- Minimize blue light emissions
- Be fully shielded (pointing downward). This particular requirement is important to enable OEM activities, such as emergency helicopter landings.

Among other things, abiding by these guidelines allows residents to enjoy ocean, bay and night sky vistas including the planets, stars, meteor showers and other night sky events without interference from unnecessary light.

Recommendation 6.8.2: The Planning Board, when making recommendations to the Borough Council for ordinance changes, and when considering variance requests, should recommend lighting that meets requirements of, and is recommended by IDA (nightsky.org)

Recommendation 6.8.3: The Borough should partner with utilities or other public entities when they plan new lighting to minimize impact on residents. For example, the street lights that the NJDOT installed when they installed the new street lights on Rt. 35 are very bright and shine into some residential properties.

6.9 Noise Pollution

Excessive noise affects our quality of life. Sources of noise include those from on land as well as on the water. With the increase of construction, outdoor pools and outdoor speakers, more people are making outdoor noise and playing music outdoors and while pools are in use, well into the night, especially on weekends. Table 7 summarizes Mantoloking's current noise regulations that fall under Police Regulations.

Table 7: Summary of Police Regulations Regarding Noise

| Noise Prohibited | Days/Hours Prohibited |
|--|-----------------------|
| Radios/TVs/Similar Devices - plainly audible across boundaries/50' from device | 2200 - 0800 |
| Speakers - plainly audible | 2200 - 0800 |
| Animals - frequent or habitual noise = noise disturbance (a noise disturbance shall include any sound in excess of the standards set forth in N.J.A.C. 7.29-1.2) | Anytime |
| Loading/Unloading that causes noise disturbance | 1800 - 0800 |
| Construction noise - weekdays | 1800 - 0800 |

| | |
|---|--|
| Construction noise - weekends & Holidays | 1800 Sat - 0800 Mon |
| Construction | Not Sunday, Holidays; Between 6/15 - 9/15 - not on Saturday |
| Landscaping | Permitted until Noon Saturdays, but not parked on public roads |
| Vehicle/Boat repair - Can't create noise disturbance | Anytime |
| Beach - no sound reproduction that can be heard beyond 6' | Anytime |
| Sound Levels Prohibited | Days/Hours Prohibited |
| Continuous sound > 65 dBA (Decibels) | 0700 - 2200 |
| Impulsive Sound > 80 dBA | 0700 - 2200 |
| Commercial Continuous Sound > 50 dBA | 2200 - 0700 |
| Commercial Impulsive Peak Sound > 80 dBA & > 4X/HR | 2200 - 0700 |

These police regulations are quite complete, but, regrettably, enforcement is lacking. Generally speaking, the Police only respond to residents' complaints.

Recommendation 6.9.1: The police should enforce the Borough's noise regulations to improve the Mantoloking residents' quality of life.

The other source of noise, especially during warm months, is motor boats on the ocean and bay. New Jersey does have a Power Vessel Noise Control Act. Its requirements are summarized as follows:

- The exhaust of every internal combustion engine on any vessel must be effectively muffled. That is, the engine's exhaust must be muffled or suppressed at all times so as not to create excessive noise; cutouts are not allowed.
- It is unlawful to operate a vessel that exceeds a noise level of 90 dBA.
- Exceptions to the muffler requirement are made to:
 - Vessels participating in races sanctioned by the USCG or New Jersey State Police
 - Vessels with a race test permit issued by the State Police.

Enforcement of the Power Vessel Noise Control Act poses a few issues for the police. It is often difficult to determine whether a muffler is in place. Further, noisy boats are often fast boats and are hard to catch. Enforcement also requires a calibrated decibel meter.

Recommendation 6.9.3: The Borough should work with state legislators to simplify the Power Vessel Noise Control Act to enable improved enforcement. More specifically, the allowed noise level for power boats should be reduced to the same as for land activities, i.e., no more than 65 dBA at any time.

Recommendation 6.9.4: MEC recommends police enforcement of boat noise on the water by Mantoloking, Federal, State, and/or County agencies, to greatly improve residents' quality of life especially in summer months. Free decibel meter apps are available for smartphones that could be used for warnings.

6.10 Vegetation

Recommendation 6.10.1: The Planning Board should ban planting of invasive plants and require use of native plants in municipal gardens and advocate their use in commercial and residential gardens in the Borough.

Native plants provide multiple benefits to people and wildlife, while contributing greatly to healthy soil and water in urban and rural areas. Native plants:

- use less fertilizer
- require fewer to no pesticides
- require less water
- require less maintenance, and thus help keep the air cleaner and reduce noise pollution
- provide shelter and food for wildlife, and support pollinators
- promote biodiversity and stewardship of our natural heritage
- have been shown to save money in many different ways.

www.jerseyyards.org is an excellent resource for more information about appropriate native plants, trees and shrubs for Mantoloking. They provide tools for native plant selection and their Guide to Landscaping with Native Plants in the Barnegat Bay Watershed is outstanding: https://www.barnegatbaypartnership.org/wp-content/uploads/2017/06/BBP_Native-Plant-brochure-May-2017-Final.pdf

Recommendation 6.10.2: The Planning Board should encourage use of environmentally sensitive lawns. Native varieties require less watering and fertilizing. Unnecessary and non-organic fertilizing should be discouraged as it contributes to non-point pollution of Barnegat Bay.

6.11 Sustainability/Renewable Energy

The Borough has created a Green Team Advisory Committee whose responsibilities include managing the Borough's participation in the Sustainable Jersey program and to encourage the pursuit of sustainable practices where possible. There are many sustainable certification programs in which Mantoloking can participate, e.g., an Anti-Idling Education & Enforcement Program, and Grass – Cut It & Leave It Program.

Recommendation 6.11.1: Adopt ordinances that promote renewable energy, e.g., solar and geothermal.

6.12 Business Zone

Recommendation 6.12.1: The Borough Council and the Planning Board seek to limit the commercial aspects of the town, perhaps consider purchasing the commercial properties for potential future Government use or open space.

6.13 On the Water Enforcement

Recommendation 6.13.1: The Borough and Police should work with appropriate federal, state and county agencies to enhance and make effective the slow speed/no wake buoys for the entire length of the Borough bayfront to attenuate the noise nuisance and reduce wave action and subsequent reliction of natural shorelines. Consider establishing a Bay Head/Mantoloking slow speed/no wake harbor zone as depicted in Figure 16.

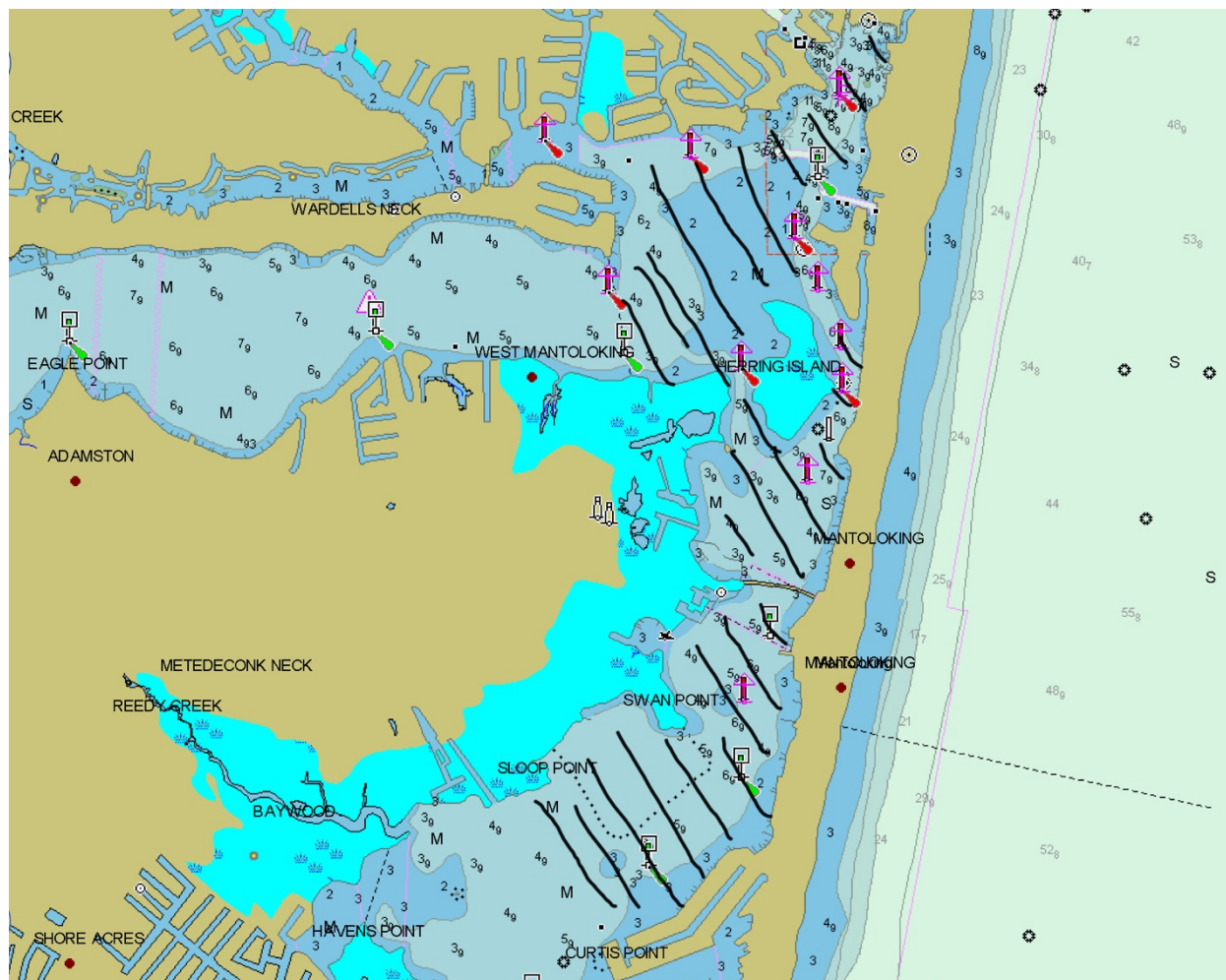


Figure 16: Possible Bay Head/Mantoloking Slow Speed/No Wake Harbor Zone

Recommendation 6.13.2: To protect shorelines from reliction, such as Swan Point, the Borough should collaborate with the NJDEP Division of Wildlife and Fisheries and local environmental agencies. It would be beneficial to have areas like Swan Point, Reedy Creek, Wreck Creek and T Cove (the latter two near Sloop Point) declared as marine conservation zones.

Enforcement on the water is a huge issue as jurisdiction is so fragmented, and available resources so scarce. National Wildlife Federation agents can only enforce on land, not water; and there is only one agent for the entire Barnegat Bay region. NJDEP Division of Wildlife and Fisheries agents can enforce on the water; again, there is only one agent for the entire Barnegat Bay region. Municipalities can only enforce with 200' of hard structures along the shoreline, e.g., bulkheads and docks; and, only 5 of 37 bayfront municipalities have marine patrol units. The

Ocean County Sheriff has jurisdiction for the entire Barnegat Bay, but currently has one boat, one jet ski and 12 officers assigned to their marine unit. They alternate patrolling in north, central and south Barnegat Bay on Fridays, Saturdays and Sundays during the summer. The jet ski focuses on shallow water areas such as the marine conservation zone in the Sedge Islands. The NJ State Police have jurisdiction, are well staffed and have sufficient boats; but Barnegat Bay is a large body of water. The Coast Guard has jurisdiction, but, for the most part, leaves enforcement on Barnegat Bay up to the State Police, while the focus on the ocean. At the SBB Charting a Course for Barnegat Bay conference, the NJ DEP agreed to create a roadmap of whom to call when you see a violation. They also have a free app, WarnDEP, and a number to call (877) WARNDP to report any kind of violation.

Recommendation 6.13.3: The Borough should sustain and continue a marine patrol presence on the Mantoloking bay shore, utilizing appropriate equipment and trained officers, from the weekend before Jul 4th to Labor Day, inclusive, annually. The MEC passed a resolution to the effect in October 2019 and forwarded it to the Borough Council.

6.14 Historic Places

Prior to Superstorm Sandy, an historic district existed in Mantoloking. Many of the historic houses were destroyed, but a few remain, namely:

- Mantoloking Yacht Club original club house – Block 30 Lot 6 AB
- St. Simons by-the-sea Episcopal Church – Block 34 Lot 16
- Arnold House (Colie/Brett home) (now Boocock)- 1312 Ocean Ave. Block 34 Lot 13
- Arnold Cottage - 1338 Bay Ave (now McLean) - Block 33 Lot 10 AB
- Fish-Foote-Lovering House (now Sigety) – 1313 Bay Ave – Block 33 Lot 1 AB
- The Chimneys (now O'Malley) – 1231 Bay Ave – Block 27 Lot 16

Recommendation 6.14.1: The Mantoloking Historic District should be reinstated with associated signage.

Appendix A References

1. Mantoloking Historic Property Report, Anne Benedict et al, 1980.
2. An Exercise in Nostalgia, Mantoloking 1880 – 1920, Frederic R. Colie, 1970.
3. Mantoloking Through the Lens, Centennial Edition, Compiled by Anne L. Benedict, 2009. (First Edition – 2001)
4. Mantoloking Historical Survey, Marilyn Kralik et al, 1980.
5. https://en.wikipedia.org/wiki/Mantoloking,_New_Jersey
6. NJ Coastal Plain: <https://eps.rutgers.edu/centers-institutes/rutgers-core-repository/nj-coastal-plain>
7. <https://mapmaker.rutgers.edu/Ocean/OldOceanCounty.html>
8. <https://www.nj.gov/dep/gis/digidownload/metadata/lulc02/lulc02statisticstables.htm#wma13>
9. Based on a telephone conversation with Chris (732-383-1729) of amwater.com on 9/9/19.
10. Based on a telephone conversation with John Meehan (732-284-1459), the JCP&L Ocean County Point of Contact, on 10/4/19.
11. From a telephone conversation with Kevin Roberts (kroberts@njresources.com) on 10/??/19.
12. Copied from Belmar Environmental Resource Inventory: http://www.belmar.com/useruploads/files/Belmar_ERI.pdf
13. Excerpt from draft Mantoloking Master Plan, prior to 11/9/17 adoption of Master Plan Re-examination Report.
14. Information provided by Mantoloking Tax Assessor, Gary R. Dalcorsio (taxassessor@mantoloking.org)
15. From Barnegat Bay Watershed Management Area Map (2007 Land Use)
16. The information contained in this section was obtained from <https://websoilsurvey.sc.egov.usda.gov>.
17. From [New Jersey Coastline Change \(1839-75\)](#)
18. From <https://anjec.org/the-environmental-resource-inventory-eri/>
19. Text supplied by Kevin Roberts (KRoberts@NJResources.com) of NJNG CO. via email on 10/15/19.
20. New Jersey's Rising Coastal Risk, Rhodium Group. October 2019: https://rhg.com/wp-content/uploads/2019/10/Rhodium_NJCoastalRisk_Oct2019final.pdf
21. https://geology.rutgers.edu/images/stories/faculty/miller_kenneth_g/Sealevelfactsheet7112014update.pdf

Appendix B Open Space Index

- The Ocean beach east of the dunes.
- The eastern street ends at Lyman, Downer, Princeton
- The Barnegat Bay street ends at Albertson, Princeton, Arnold, Old Bridge St., Lyman, and limited access at Bergen (Patty Brand native garden).
- There is a small parcel of landscaped open space to the west of the newly constructed Borough Hall.