# 2.0 WATER RESOURCES

## 2.1 WATER SUPPLY

### Inventory

The Dennis Water District supplies drinking water to the entire Town. There are a handful of properties that are served by individual wells. The source of all the water is from the Monomoy Lens. The Monomoy groundwater lens is the sole sources of water for Dennis, as well as the Towns of Harwich, Brewster, Orleans and Chatham, as stated in the *Monomoy Capacity Study, July 1996*. Overall the lens supplies drinking water to over 40,000 homes and businesses that are served by 48 municipal public water supply wells and an estimated 1,000 private wells. In 1995 alone, municipal suppliers pumped an average of over 5.5 million gallons per day. In the summer season, this figure doubles or triples.

The Town of Dennis is served by 23 wells. Refer to Table 2.1.1. All wells are located north of Route 6. The information in this table is from the *Monomoy Capacity Study* and it includes the well name, location, DEP Identification and pumping rate in gallons per minute. From the water supply figures, existing daily supply volume was calculated based on a 16-hour pumping day at each well. This figure is regarded as a typical pumping schedule under average summer conditions.

Water use demand is the total amount of water pumped by a town in a given time period. Water demand is usually reported as annual water use, average daily water use or maximum daily use. Average day demand (ADD) is the total annual amount of water used by each community divided by 365 days. Maximum daily demand (MDD) is the greatest volume pumped on any one day MDD usually occurs for one or two days in the summer when tourism, air temperature and the need for water are greatest. Existing water demand was based on average day demand from 1995 Water Management Act registration reports Table 2.1.2, taken from an October 1994 DEM report, "Water Resources of Cape Cod, Water Use, Hydrology, and Potential Changes in Ground Water Levels." The Massachusetts Water Resource Commission (WRC) has approved these figures for use in the permitting process for existing and future water withdrawals.

The recharge areas for the wells are shown on Map 2.1.1. These areas have been approved by DEP. The Water District is now looking into and for a site for a future one million-gallon per day well. This well is needed to help get through peak demand periods as well as the town's growth needs.

There are three irrigation wells within the Town of Dennis, all of which are located within the town's golf courses. Each of these wells is registered with DEP.

**TABLE 2.1.1**

DENNIS PUBLIC SUPPLY WELL SUMMARY

| Well Name | Location | DEP ID | Pumping Rate (GPM) | 16 Hr. Capacity (MGD) | 24 Hr. Capacity (MGD) |
|---|---|---|---|---|---|
| MAIN 5 Wells | Old Bass River Rd. | 01G | 700 | | |
| #1 | Old Chatham Rd. | 02G | 350 | | |
| #2 | Old Chatham Rd. | 03G | 200 | | |
| #3 | Old Chatham Rd. | 04G | 250 | | |
| #4 | Old Bass River Rd. | 05G | 250 | | |
| #5 | Rte 134 | 06G | 450 | | |
| #6 | Old Bass River Rd. | 07G | 150 | | |
| #7 | Airline Rd. | 08G | 450 | | |
| #8 | Airline Rd. | 09G | 350 | | |
| #9 | Grassy Pond | 10G | 650 | | |
| #10 | Airline Rd. | 11G | 700 | | |
| #11 | Old Bass River Rd. | 12G | 500 | | |
| #12 | Old Chatham Rd. | 13G | 700 | | |
| #14 | Baker Pond | 15G | 450 | | |
| #15 | Baker Pond | 16G | 700 | | |
| #16 | Timber Lane | 17G | 600 | | |
| #18 | Hokum Rock | 18G | 700 | | |
| #19 | Setucket Rd. | 19G | 700 | | |
| #20 | Setucket Rd. | 20G | 700 | | |
| #21 | On line in 2003 | | 500 | | |
| #22 | On line in 2003 | | 700 | | |
| **Total Existing & Future Supply** | | | **10,750** | **10.32** | **15.48** |

Source: Dennis Water District

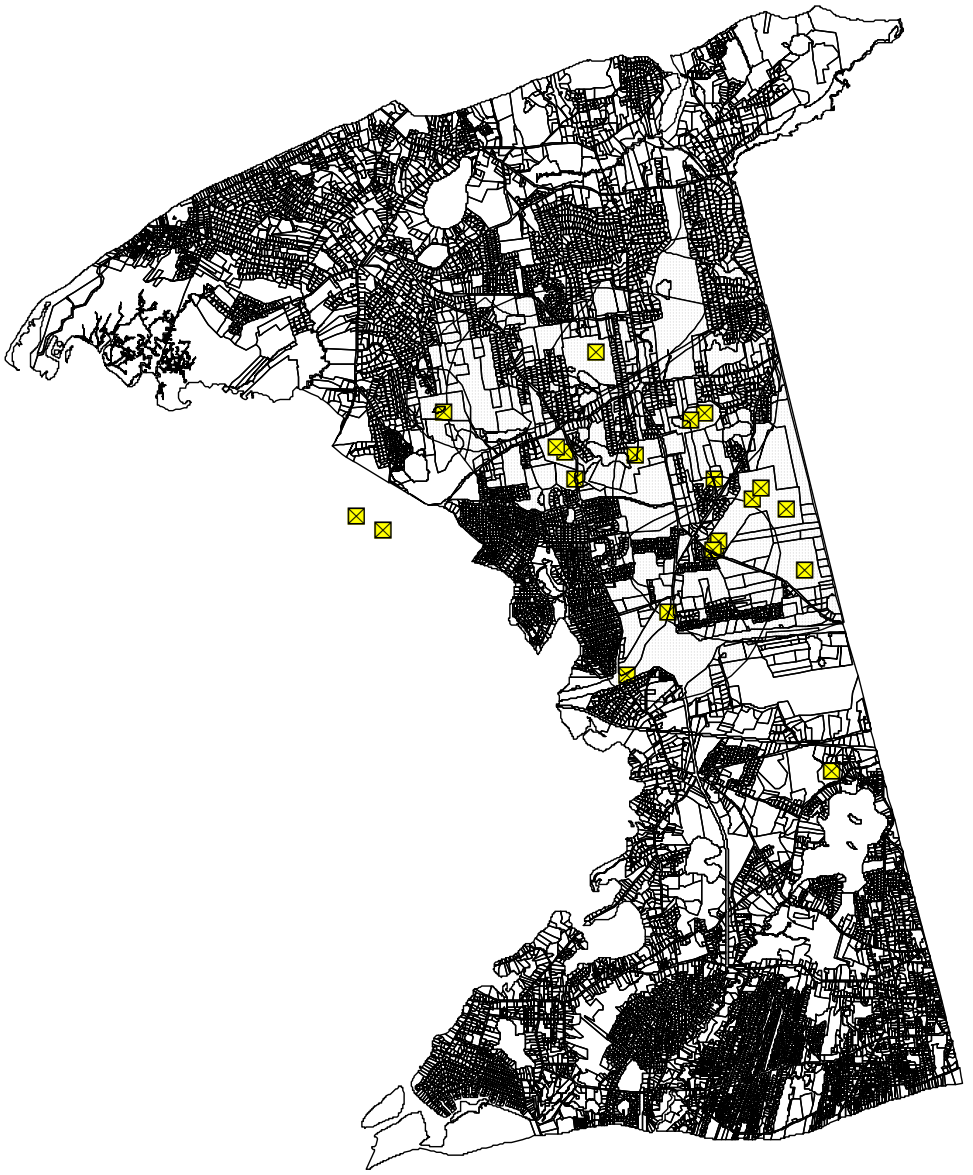
**Table 2.1.2**

1995 – 2020 Average Annual Water Needs Forecasts
(million gallons per day)

| Community | W.M.A. Registration | Base 1986-1990 ADD | 1995 | 2000 | 2010 | 2020 | Change Base-2020 |
|---|---|---|---|---|---|---|---|
| Brewster | 0.63 | 1.03 | 1.24 | 1.46 | 1.57 | 1.74 | 0.71 |
| Harwich | 1.20 | 1.58 | 1.94 | 2.07 | 2.16 | 2.37 | 0.79 |
| **Dennis** | **2.10** | **2.49** | **2.78*** | **2.57*** | **3.26** | **3.59** | **1.10** |
| Yarmouth | 3.03 | 3.47 | 4.60 | 5.39 | 6.82 | 7.56 | 4.09 |
| Total | 6.96 | 8.57 | 10.59 | 11.85 | 13.81 | 15.26 | 6.69 |
| Total for Entire Cape | 20.29 | 23.74 | 26.09 | 29.09 | 35.73 | 38.86 | 15.16 |

* !995 and 2000 Dennis Data actual water use per Dennis Water District

Source: Monomoy Capacity Study, 1996 and DEM Office of Water Resources



# Map 2.1.1

## Zones of Contribution

2000 0 2000 4000 6000 Feet

Parcel Lines
Public Wells
Zones of Contribution

N

There is no public sewer serving the Town of Dennis. All properties are served by individual cesspools or Title 5 systems. There are some common systems serving several properties, but there are no private sewage treatment facilities.

**Analysis**

The Monomoy Capacity Study projected future demands for water usage. Water demand was calculated on the build out analysis conducted for the study and presented in the Land Use/Growth Management Section. Development scenarios were conducted for the years 2005, 2010 and 2015, including a 50% shift from seasonal to year round units in the year 2015. Water demand was calculated separately for residential units (seasonal and year-round), and commercial units. Water use for each land use was figured at 330 gallons per day for each year round unit. For seasonal units, flow was lowered to one third of this amount taking into account seasonal occupancy. Commercial water use was estimated at 75 gallons per day per thousand square feet of commercial building area. Table 2.1.3 provides a summary of the water demand in each future development scenario.

Water demand for the year 2020, based on population projections, was used as a comparison to the scenarios based on the build-out analysis. The 2020 figures were obtained from the forecasted needs assessment of October 1994 Department of Environmental Management Report. A summary of the average annual water needs forecast from the DEM report is included in Table 2.1.3.

Figure 2.1.1 includes a series of bar graphs that summarize the supply/demand results for existing conditions, 2015 with seasonal shift conditions, and the 2020 DEM forecast conditions.

With newer wells coming on line, the Dennis Water District does not anticipate any water shortfalls due to pumping capacity. The Water District reports that it has future pumping under control and is in a great position to provide for all of the town's water needs.

The Monomoy Capacity Study provides forecast scenarios which illustrate a worst case future if the town and other surrounding towns do nothing to add capacity or conserve water (i.e. leak detection, etc). The only limiting factor relative to water supply for the Town of Dennis is the capacity of the Monomoy Lens itself.

**TABLE 2.1.3**
**SUPPLY AND DEMAND**
MONOMOY LENS – DENNIS

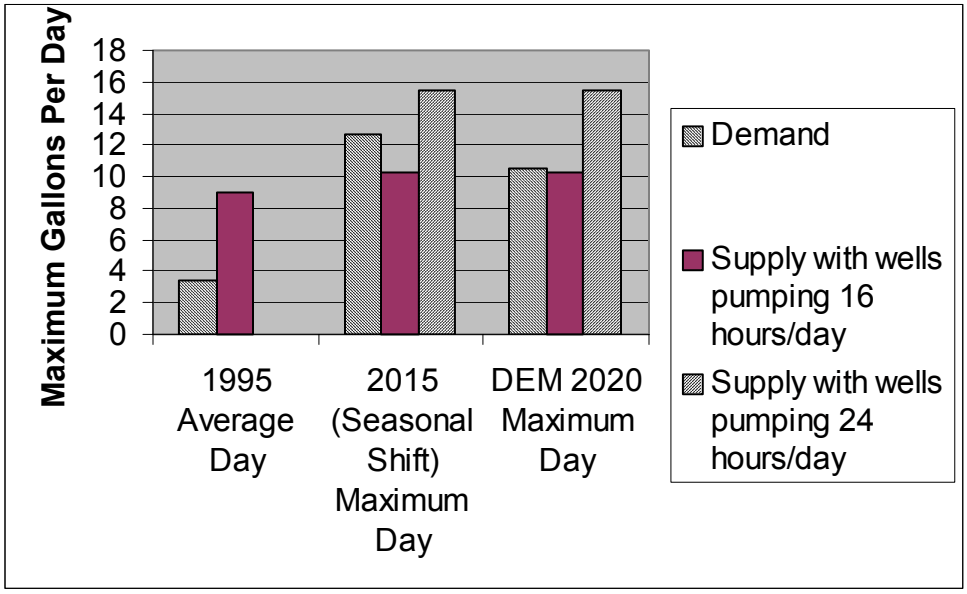
| YEAR | YEAR ROUND HOUSING UNITS | TITLE 5 FLOW (330GPD/UNIT) | Seasonal Housing Units | Title 5 Flow (110gpd/unit) | Commercial Area (sq.ft) | Title 5 Flow (75gpd/1000s.f.) | Total Water Use (GPD)[1] | Largest Well (MGD) |
|---|---|---|---|---|---|---|---|---|
| **DENNIS** | | | | | | | | |
| **1995** | | | | | | | 2,810,000 | |
| **2005** | 7,234 | 2,387,220 | 6,770 | 744,700 | 2,500,556 | 194,967 | 3,326,887 | |
| **2010** | 7,472 | 2,465,760 | 6,992 | 769,120 | 2,807,056 | 210,529 | 3,445,409 | |
| **2015** (current mix) | 7,687 | 2,536,710 | 7,195 | 791,450 | 3,014,556 | 226,092 | 3,554,252 | 0.67 |
| **2015** (seasonal shift) | 11,285 | 3,724,050 | 3,597 | 395,670 | 3,056,056 | 229,204 | 4,348,924 | |
| **2020** | | | | | | | 3,590,000 | |
| MONOMOY LENS TOTALS | | | | | | | | |
| **1995** | | | | | | | | |
| **2005** | | | | | | | | |
| **2010** | | | | | | | | |
| **2015** (current mix) | | | | | | | | |
| **2015** (seasonal shift) | | | | | | | | |
| **2020** | | | | | | | | |

| | AVERAGE DAILY CONDITIONS (MGD) | | | **MAXIMUM DAY CONDITIONS (MGD)** | | | | |
|---|---|---|---|---|---|---|---|---|
| | Adjusted Demand[2] | Supply (wells pumping 16 hours/day) | Excess/ Shortfall | Adjusted Demand[3] | Supply (wells pumping 16 hours/day) | Supply (wells pumping 24 hours/day) | Excess/ Shortfall (16 hr. pumping) | Excess/ Shortfall (24 hr. pumping) |
| DENNIS | 3.48 | 8.98 | 5.50 | 7.70 | 8.98 | 13.46 | 1.29 | 5.77 |
| **1995** | 4.00 | 9.17 | 5.17 | 9.82 | 9.17 | 13.75 | -0.65 | 3.93 |
| **2005** | 4.12 | 9.17 | 5.05 | 10.14 | 10.32 | 15.48 | 0.18 | 5.34 |
| **2010** | 4.22 | 9.17 | 4.95 | 10.44 | 10.32 | 15.48 | -0.12 | 5.04 |
| **2015** (current mix) | 5.02 | 9.17 | 4.15 | 12.63 | 10.32 | 15.48 | -2.31 | 2.85 |
| **2015** (seasonal shift) | 4.26 | 9.17 | 4.91 | 10.54 | 10.32 | 15.48 | -0.22 | 4.94 |
| 2020 | | | | | | | | |
| MONOMOY LENS | | | | | | | | |
| | 12.77 | 24.26 | 11.49 | 25.33 | 24.26 | 36.38 | -1.07 | 11.06 |
| TOTALS | 15.23 | 26.66 | 11.43 | 34.17 | 26.66 | 40.03 | -7.52 | 5.86 |
| **1995** | 15.86 | 27.23 | 11.37 | 35.92 | 27.23 | 40.85 | -8.69 | 4.93 |
| **2005** | 16.48 | 29.25 | 12.76 | 37.63 | 29.25 | 43.87 | -8.38 | 6.24 |
| **2010** | 18.78 | 29.25 | 10.47 | 43.93 | 29.25 | 43.87 | -14.68 | -0.06 |
| **2015** (current mix) | 15.44 | 29.25 | 13.81 | 34.77 | 29.35 | 43.87 | -5.52 | 9.11 |
| **2015** (seasonal shift) | | | | | | | | |
| **2020** | | | | | | | | |

[1]Water use calculated from capacity buildout analysis for 2005, 2010, 2015 and from DEM Water use forecast for 1995 and 2020. [2]Water use adjusted for DEP recommendation of meeting demand with the loss of largest well. [3]Calculated from 1993 ADD/MDD ration of 2.5. Adjusted for loss of largest well and 25 year error of 10%.

Wells may be pumped for 24hours/day only for a short period of time during times of extreme emergency. Planning should be based on pumping wells 16 hours/day.

Figure 2.1.1
Supply and Demand Chart for Dennis




Wells may be pumped 24/day for only a short period of time in emergency situations. Planning should be based on pumping wells 16 hours/day.

**Nitrogen Loading Analysis for Drinking Water Supply**

Dennis, as well as the entire Cape, depends almost entirely on groundwater for its drinking water. The Monomoy groundwater lens is one of six ground water lenses on Cape Cod, and Dennis main source of water, which together are referred to as Cape Cod's Sole Source Aquifer. Since groundwater is the only source of drinking water for Dennis, and Cape Cod, thorough protection measures are required to ensure the preservation of this natural resource for present and future residents and visitors.

One of the primary contaminants of concern to groundwater is nitrogen from residential septic systems. High levels of nitrogen in groundwater threaten to destroy this unique resource as a source for Dennis' drinking water. Nitrate-Nitrogen ($NO_3$-N) in groundwater is a health concern. There are direct health risks associated with ingesting excessive $NO_3$-N levels, including blue-baby syndrome. Also, high levels of $NO_3$-N levels indicate the water supply is intercepting septic system lechate and may be contaminated with other harmful chemicals contained in wastewater.

The current quality of groundwater in the Monomoy Lens, which includes Dennis, is relatively pristine. Nitrate occurs naturally in the environment at low concentrations, around 0.05 milligrams per liter (mg/l), from the decay of vegetation and the infiltration of nitrogen-laden precipitation. Levels over 1.0 parts-per-million (ppm) demonstrate the impacts of land development and other human activity on water purity. The Cape Cod Commission established a 5-ppm $NO_3$-N loading standard as its planning goal. This same standard is proposed for the Town of Dennis.

In order to analyze how $NO_3$-N will impact future ground water supplies individual Contributing Areas were established. A Contributing Area is defined as the land area on which rainfall enters the groundwater system and flows towards a public supply well or ground of wells. These Contributing Areas for the entire Monomoy Lens area are shown on Map 2.1.2. Each Contributing Area includes the wellhead protection land area of at least one municipal supply well (See Table 2.1.4). Because of overlaps in the Wellhead Protection Areas (WHPA), Contributing Areas were delineated. The overlap in WHPA complicated a direct accounting of groundwater flow to individual municipal supply wells. For a more detailed discussion on the methodology used please refer to the Monomoy Capacity Study – Summary Report (July 1996).

Table 2.1.4
Contributing Area Characteristics
Dennis Only

| Contributing Area | Towns | Well #'s | Area (acres) |
|---|---|---|---|
| 1 | Yarmouth | 21, 22 | 484 (66%) |
| | Dennis | | 242 (33%) |
| 2 | Dennis | 19 | 584 |
| 3 | Brewster | | 47 (6%) |
| | Dennis | 18 | 636 (94%) |
| 4 | Dennis | 4, 6, 11 | 425 |
| 5 | Brewster | | 710 (42%) |
| | Dennis | 1, 2, 3, 5, 7, 8, 10, 12 | 865 (51%) |
| | Harwich | | 108 (6%) |
| 6 | Dennis | Main | 368 |
| 7[1] | Dennis | 13 | 226 |
| 8 | Dennis | 9, 14, 15, 16 | 644 |

[1]Dennis Well #13 has taken off line due to contamination. The contributing area has been eliminated by DEP.

Table 2.1.5 represents a comparison of predicted and observed nitrogen concentrations within those Contributing Areas that effect the Town of Dennis.

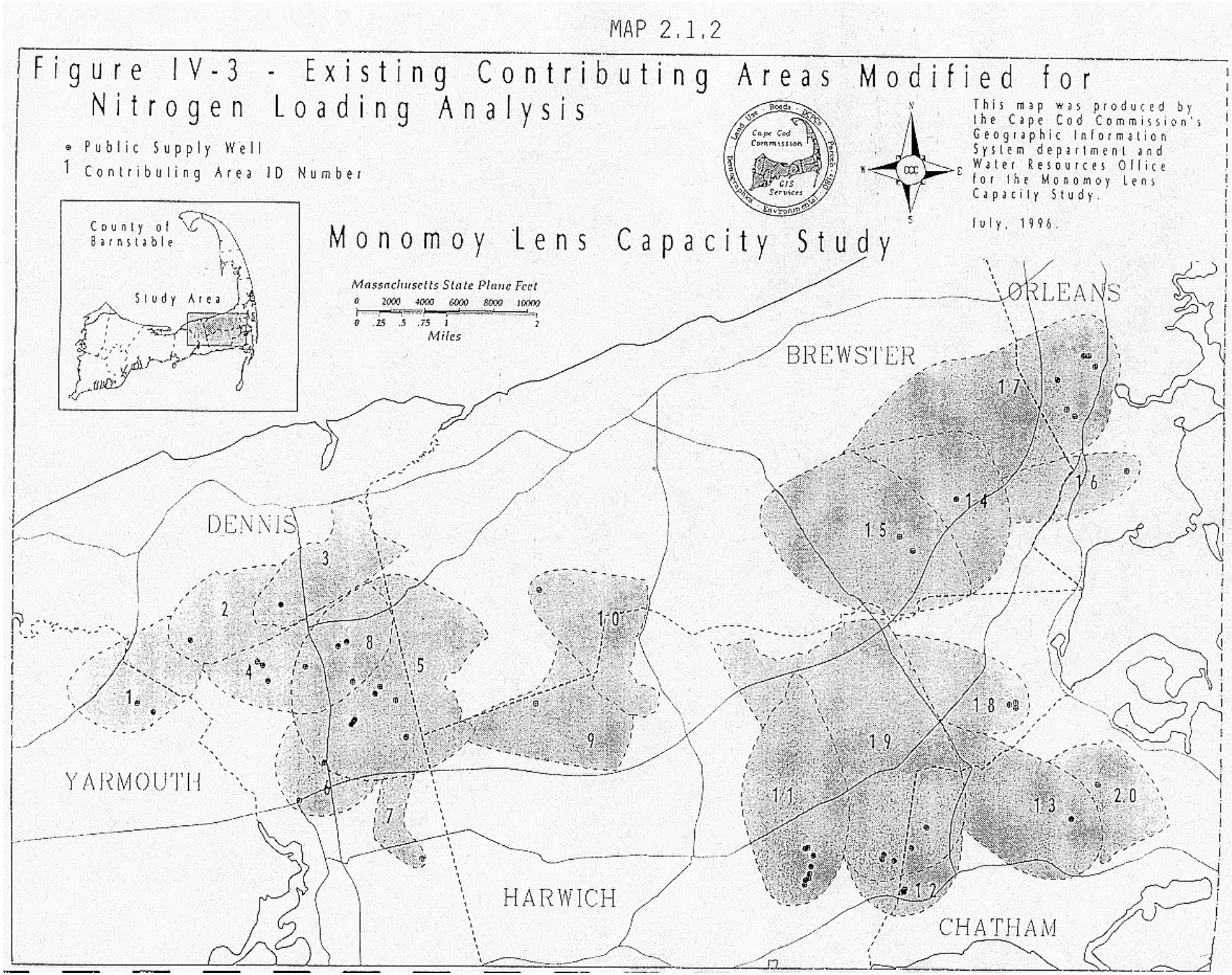
TABLE 2.1.5
Nitrogen Concentrations – Predicted and Observed

| Contributing Area | 1972-1995 Average $NO_3$-N (ppm) | 1995 Average $NO_3$-N (ppm) | Estimated Existing $NO_3$-N (ppm) |
|---|---|---|---|
| 1 | 0.92 | 1.03 | 3.57 |
| 2 | 0.28 | 0.30 | 2.17 |
| 3 | 0.99 | 1.10 | 2.02 |
| 4 | 0.30 | 0.42 | 3.07 |
| 5 | 0.67 | 0.87 | 2.55 |
| 6 | 0.64 | 0.93 | 3.18 |
| 7[1] | 0.87 | 0.86 | 1.12 |
| 8 | 0.59 | 1.20 | 2.40 |

[1]Now Off Line. Source: Monomoy Capacity Study, July 1996

MAP 2.1.2

# Figure IV-3 - Existing Contributing Areas Modified for Nitrogen Loading Analysis



Tables 2.1.6 – 2.1.8 represent the Volatile Organic Contaminants (VOC), Synthetic Organic Contaminants (SOC), Inorganic Contaminants (IOC) tested for within the district wells. Table 2.1.9 presents additional monitoring results.

**DENNIS WATER DISTRICT** TABLE 2.1.6

04/30/01

Volatile Organic Contaminant Report PWS ID#4075000

RESULTS IN UG/L OR PPB

RESULTS

| | | WELL | WELL | WELL | WELL | WELL | WELL | WELL | WELL | WELL | WELL | WELL | WELL | WELL | WELL | WELL | WELL | WELL | WELL | WELL | WELL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MCL | M/S | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 18 | 19 | 20 |
| Benzene | 5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Carbon Tetrachloride | 5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| 1,1-Dichloroethylene | 7 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| 1,2-Dichloroethane | 5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| para-Dichlorobenzene | 5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Trichloroethylene | 5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| 1,1,1-Trichloroethane | 200 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Vinyl Chloride | 2 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Monochlorobenzene | 100 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| o-Dichlorobenzene | 600 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| trans-1,2-Dichloroethylene | 100 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| cis-1,2-Dichloroethylene | 70 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| 1,2-Dichloropropane | 5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Ethylbenzene | 700 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Stryrene | 100 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Tetrachloroethylene | 5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Toluene | 1000 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Xylenes (total) | 10000 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Dichloromethane | 5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| 1,2,4-Trichlorobenzene | 70 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| 1,1,2-Trichloroethane | 5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Chloroform | NONE | 2.4 | 2.6 | 1.7 | 1 | 0.8 | 1.3 | 1 | 1.9 | 0.8 | 3.2 | 3.6 | 0.8 | 3.9 | | 2.6 | 1.8 | 3.1 | 1.5 | ND | ND |
| Bromodichloromethane | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Chlorodibromomethane | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Bromoform | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| m-Dichlorobenzene | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Dibromethane | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| 1,1-Dichloropropene | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| 1,1-Dichloroethane | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| 1,1,2,2-Tetrachloroethane | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| 1,3-Dichloropropane | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Chlormethane | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Bromomethane | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| 1,2,3-Trichloropropane | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| 1,1,1,2-Tetrachloroethane | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Chloroethane | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| 2,2-Dichloropropane | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| o-Chlorotoluene | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| p-Chlorotoluene | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Bromobenzene | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| 1,3-Dichloropropene | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| 1,2,4-Trimethylbenzene | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| 1,2,3-Trichlorobenzene | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| n-Propylbenzene | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| n-Butylbenzene | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Naphthalene | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Hexachlorobutadiene | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| 1,3,5-Trimethylbenzene | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| p-Isopropyltoluene | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Isopropytolunene | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Tert-butylbenzene | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Sec-butylbenzene | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Fluorotrichloromethane | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Dichlorodifluoromethane | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Bromochloromethane | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |
| Methyl-tertairy-Butyl Ether | NONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | ND | ND | ND | ND | ND | ND |

NOTE: ND = NO DETECTION PG1 NOTE: WELL 13 IS OFF LINE

TABLE 2.1.7

# DENNIS WATER DISTRICT

02/15/00

PWS ID#4075000

Synthetic Organic Report

RESULTS IN MG/L OR PPM

| Regulated Componds | MCL ug/l | WELL M/S | WELL 1 | WELL 2 | WELL 3 | WELL 4 | WELL 5 | WELL 6 | WELL 7 | WELL 8 |
|---|---|---|---|---|---|---|---|---|---|---|
| Carbofuran | 40 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Oxamyl (Vydate) | 200 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2,4-D | 70 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2,4,5-TP (Silvex) | 50 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Dalapon | 200 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Dinoseb | 7 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Picloram | 500 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Alachor | 2 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Atrazine | 3 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Chlordane | 2 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Endrin | 2 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Heptachlor | 0.4 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Heptachlor epoxide | 0.2 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Lindane | 0.2 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Methoxychlor | 40 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| PCB Aroclor 1016 | | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| PCB Aroclor 1221 | | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| PCB Aroclor 1232 | | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| PCB Aroclor 1242 | | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| PCB Aroclor 1248 | | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| PCB Aroclor 1254 | | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| PCB Aroclor 1260 | | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| PCB's (decachlorobiphenyl) | 0.5 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Pentachlorophenol | 1 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Toxaphene | 3 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Benzo (a) pyrene | 0.2 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Di (2-ethylhexyl) adipate | 400 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Di (2-ethylhexyl) phthalates | 6 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Hexachlorobenzene | 1 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Hexachlorocyclopentadiene | 50 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Simazine | 4 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Dibromochloropropane | 0.2 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Ethylene dibromide (EDB) | 0.02 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| **Componds: Unregulated** | | | | | | | | | | |
| Aldicarb | 0.5 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Aldicarb sulfoxide | 0.5 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Aldicarb sulfone | 0.7 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Carbaryl | 2 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 3-Hydroxycarbofuran | 2 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Methomyl | 1 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Dicamba | 0.08 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Aldrin | 0.05 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Butachlor | 0.05 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Dieldrin | 0.01 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Metolachlor | 0.05 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Metribuzin | 0.05 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Propachlor | 0.05 | ND | ND | ND | ND | ND | ND | ND | ND | ND |

TABLE 2.1.7 PART 2

RESULTS IN MG/L OR PPM

| Regulated Componds | MCL ug/l | WELL 9 | WELL 10 | WELL 11 | WELL 12 | WELL 14 | WELL 15 | WELL 16 | WELL 18 | WELL 19 | WELL 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Carbofuran | 40 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Oxamyl (Vydate) | 200 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2,4-D | 70 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2,4,5-TP (Silvex) | 50 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Dalapon | 200 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Dinoseb | 7 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Picloram | 500 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Alachor | 2 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Atrazine | 3 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Chlordane | 2 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Endrin | 2 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Heptachlor | 0.4 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Heptachlor epoxide | 0.2 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Lindane | 0.2 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Methoxychlor | 40 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| PCB Aroclor 1016 | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| PCB Aroclor 1221 | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| PCB Aroclor 1232 | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| PCB Aroclor 1242 | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| PCB Aroclor 1248 | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| PCB Aroclor 1254 | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| PCB Aroclor 1260 | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| PCB's (decachlorobiphenyl) | 0.5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Pentachlorophenol | 1 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Toxaphene | 3 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Benzo (a) pyrene | 0.2 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Di (2-ethylhexyl) adipate | 400 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Di (2-ethylhexyl) phthalates | 6 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Hexachlorobenzene | 1 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Hexachlorocyclopentadiene | 50 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Simazine | 4 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Dibromochloropropane | 0.2 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Ethylene dibromide (EDB) | 0.02 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| **Componds: Unregulated** | | | | | | | | | | | |
| Aldicarb | 0.5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Aldicarb sulfoxide | 0.5 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Aldicarb sulfone | 0.7 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Carbaryl | 2 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 3-Hydroxycarbofuran | 2 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Methomyl | 1 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Dicamba | 0.08 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Aldrin | 0.05 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Butachlor | 0.05 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Dieldrin | 0.01 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Metolachlor | 0.05 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Metribuzin | 0.05 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Propachlor | 0.05 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |

TABLE 2.1.8

# DENNIS WATER DISTRICT

02/14/00 PWS ID#4075000

INORGANICS REPORT

RESULTS IN MG/L OR PPM

| | MCL | WELL M/S | WELL 1 | WELL 2 | WELL 3 | WELL 4 | WELL 5 | WELL 6 | WELL 7 | WELL 8 |
|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | 0.05 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Barium | 2 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Cadmium | 0.005 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Chromium | 0.1 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Fluoride | 4 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Mercury | 0.002 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Selenium | 0.05 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Sodium | none | 19 | 14 | 12 | 10 | 14 | 54 | 28 | 9 | 9 |
| Antimony | 0.006 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Beryllium | 0.004 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Nickel | 0.1 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Thallium | 0.002 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Cyanide | 0.2 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Sulfate | none | 7 | 8 | 5 | 7 | 6 | 8 | 8 | 6 | 7 |

| | WELL 9 | WELL 10 | WELL 11 | WELL 12 | WELL 13 | WELL 14 | WELL 15 | WELL 16 | WELL 18 | WELL 19 | WELL 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Barium | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Cadmium | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Chromium | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Fluoride | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Mercury | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Selenium | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Sodium | 16 | 9 | 13 | 9 | 76 | 14 | 12 | 12 | 14 | 10 | 10 |
| Antimony | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Beryllium | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Nickel | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Thallium | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Cyanide | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Sulfate | ND | 6 | 8 | ND | 32 | 6 | 6 | 15 | 7 | 9 | 7 |

TABLE 2.1.9

01/16/2002 2002 DL DENNIS WATER DISTRICT PWS ID#4075000

Secondary reports

RESULTS IN MG/L OR PPM

| | | WELL | WELL | WELL | WELL | WELL | WELL | WELL | WELL | WELL |
|---|---|---|---|---|---|---|---|---|---|---|
| | MCL | M/S | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Turbidity (NTU) | | 0.3 | 0.2 | 0.1 | 0.01 | 0.9 | 0.1 | 0.3 | 0.1 | 0.1 |
| TDS / Conductivity | 500 | 296 | 141 | 116 | 98 | 166 | 342 | 124 | 81 | 80 |
| Color (color units) | 15 | 1 | 1 | 1 | 1 | 1 | 1 | 20 | 1 | 1 |
| Odor (TON) | 3 | none | none | none | none | none | none | none | none | none |
| pH | | 7.6 | 6.1 | 5.7 | 6.3 | 6 | 6 | 5.9 | 6.9 | 6.4 |
| Alkalinity (CaCO3) | | 36 | 2 | 2 | 4 | 4 | 4 | 4 | 2 | 2 |
| Hardness (CaCO3) | | 32 | 23.4 | 23 | 22.7 | 23.1 | 32.7 | 23.3 | 21.3 | 19.9 |
| Calcium (Ca) | | 5.4 | 2.3 | 2.3 | 2 | 2 | 5.5 | 2.1 | 1.6 | 1.2 |
| Magnesium (mg) | | 4.5 | 4.3 | 4.2 | 4.3 | 4.4 | 4.6 | 4.4 | 4.2 | 4.1 |
| Aluminum (Al) | 0.2 | BRL | BRL | BRL | BRL | BRL | BRL | BRL | BRL | BRL |
| Potassium (K) | | 21.8 | 1.8 | 2.4 | 2.6 | 1 | 3.3 | 0.7 | 1.7 | 1.1 |
| Iron (Fe) | 0.3 | 0.1 | 0.1 | 0.1 | 0.1 | 0.3 | 0.1 | 0.1 | 0.1 | 0.1 |
| Manganese (Mn) | 0.05 | 0.02 | 0.02 | 0.01 | 0.02 | 0.02 | 0.03 | 0.02 | 0.08 | 0.27 |
| Sulfate (SO4) | 250 | 8 | 5.9 | 5.5 | 5.6 | 7.2 | 7.6 | 6.6 | 5.1 | 5.3 |
| Chloride (Cl) | 250 | 50 | 27 | 19 | 15 | 33 | 86 | 23 | 13 | 12 |
| Silver (Ag) | 0.1 | BRL | BRL | BRL | BRL | BRL | BRL | BRL | BRL | BRL |
| Copper (Cu) | 1.3 | 0.1 | 0.4 | 0.01 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Zinc (Zn) | 5 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |

| | WELL | WELL | WELL | WELL | WELL | WELL | WELL | WELL | WELL | WELL |
|---|---|---|---|---|---|---|---|---|---|---|
| | 9 | 10 | 11 | 12 | 14 | 15 | 16 | 18 | 19 | 20 |
| Turbidity (NTU) | 0.1 | 0.1 | 3 | 0.1 | 0.1 | 0.4 | 0.1 | 0.1 | 0.1 | 3.2 |
| TDS / Conductivity | 126 | 77 | 127 | 80 | 190 | 180 | 281 | 221 | 166 | 107 |
| Color (color units) | 1 | 1 | 8 | 1 | 1 | 1 | 1 | 1 | 1 | 8 |
| Odor (TON) | none | none | none | none | none | none | none | none | none | none |
| pH | 6.1 | 6.3 | 6.1 | 6.3 | 7.4 | 7.4 | 8.1 | 7.9 | 7.6 | 6.7 |
| Alkalinity (CaCO3) | 2 | 3 | 3 | 3 | 28 | 32 | 75 | 50 | 35 | 7 |
| Hardness (CaCO3) | 21 | 18.5 | 23.3 | 21 | 28.3 | 22.7 | 26.9 | 29.1 | 29 | 27.5 |
| Calcium (Ca) | 1.8 | 1 | 2.1 | 1.8 | 4.1 | 2 | 3.2 | 3.9 | 4.2 | 3.6 |
| Magnesium (mg) | 4 | 3.9 | 4.4 | 4 | 4.4 | 4.3 | 4.6 | 4.7 | 4.5 | 4.5 |
| Aluminum (Al) | BRL | BRL | BRL | BRL | BRL | BRL | BRL | BRL | BRL | BRL |
| Potassium (K) | 1.4 | 1 | 1.5 | 1.2 | 19.4 | 23.4 | 52.8 | 28.3 | 19.6 | 1.3 |
| Iron (Fe) | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 |
| Manganese (Mn) | 0.04 | 0.01 | 0.17 | 0.03 | 0.01 | 0.03 | 0.15 | 0.01 | 0.03 | 0.01 |
| Sulfate (SO4) | 6.3 | 5 | 6.4 | 5 | 4.9 | 7 | 4.6 | 9.4 | 12 | 9.9 |
| Chloride (Cl) | 25 | 14 | 24 | 15 | 67 | 23 | 21 | 19 | 15 | 16 |
| Silver (Ag) | BRL | BRL | BRL | BRL | BRL | BRL | BRL | BRL | BRL | BRL |
| Copper (Cu) | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Zinc (Zn) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |

## COASTAL SURFACE WATER BODIES

### Inventory

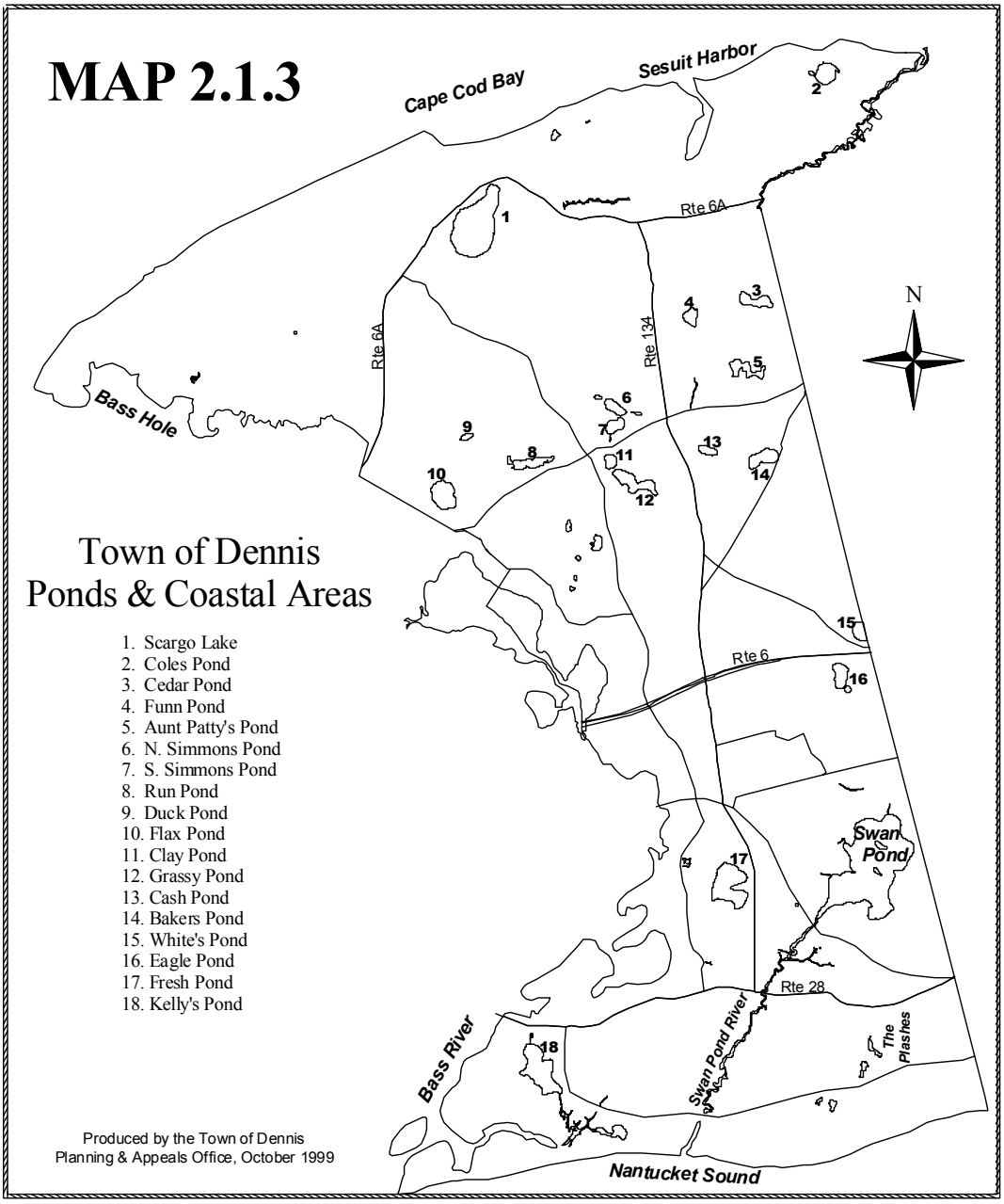
There are 29 miles of saltwater shorefront and numerous beaches. The town's marine areas include Swan Pond, Swan Pond River, Bass River, Sesuit Harbor, Nantucket Sound, Bass Hole (the mouth of Chase Garden Creek) and Cape Cod Bay. See Map 2.1.3. The Town of Dennis has been cooperating and participating regionally, through the Cape Cod Commission, in the Cape Cod Coastal Embayment Project to examine, among other things, the recharge areas and nutrient loading capacity of eight saltwater bodies in the county, including the Upper Bass River (north of Route 6). Almost all of Dennis' land area contributes via groundwater discharge to a coastal embayment, salt pond or estuary.

The Massachusetts Department of Environmental Protection (DEP) lists all of the marine (salt) waters of Dennis as Class SA, the top salt water ranking, meaning they are an "outstanding resource" whose purity should be suitable for all types of water recreation, including swimming and shellfishing.

### Analysis

As stated above, DEP has listed all of the marine (salt) waters of Dennis as Class SA. However, degradation of these areas can and may be occurring through non-point sources of pollution (road runoff, septic systems, lawn maintenance, etc.). These are the more potent threats to water quality of ponds and bays in Dennis.

Land uses within recharge areas or watersheds significantly influence surface water quality. A current study by the Cape Cod Commission (*The Cape Cod Coastal Embayment Project*, 4/97) has identified the recharge area to Upper Bass River (north of Route 6). Dennis provides 3,141 acres of this 6,436-acre recharge area, while Yarmouth and Brewster combined provide the other half. The study concludes that nitrogen loads contributed to Upper Bass River (including Follins Pond) by land use within its watershed will exceed the criteria needed to maintain the waters' SA rating, if the recharge area proceeds on its projected course to full "build out" residential development. This scenario will degrade the aesthetic and recreational value of this important marine area. The three towns will need to work together to solve this problem.


MAP 2.1.3
Cape Cod Bay
Sesuit Harbor
Rte 6A
Rte 6A
Rte 134
Bass Hole
N
Town of Dennis
Ponds & Coastal Areas
1. Scargo Lake
2. Coles Pond
3. Cedar Pond
4. Funn Pond
5. Aunt Patty's Pond
6. N. Simmons Pond
7. S. Simmons Pond
8. Run Pond
9. Duck Pond
10. Flax Pond
11. Clay Pond
12. Grassy Pond
13. Cash Pond
14. Bakers Pond
15. White's Pond
16. Eagle Pond
17. Fresh Pond
18. Kelly's Pond
Rte 6
Swan Pond
Rte 28
Bass River
Swan Pond River
The Plashes
Nantucket Sound
Produced by the Town of Dennis
Planning & Appeals Office, October 1999

In July 1990 a report was put together for the Swan Pond and Swan Pond River, called *"The Swan River Project", Report to Dennis Board of Health"*, by Theodore A. Dumas, R.S., C.H.O. As stated in the introduction, "[T]he purpose of the Swan River Project is to pull together the reams of information that has been gathered over a period of many years concerning Swan River and Swan Pond." The report indicates that the waterfowl, stormwater and road runoff and septage/nitrates have been the major contributors to contamination of these two areas. In working with the Natural Resources Office, the Shellfish Constable, the Engineering Office and the DPW, efforts were started to reduce these non-point source pollutants. "Do Not Feed the Waterfowl" signs have been posted. Septic systems for all commercial businesses along the Pond and River have been upgraded and most, if not all of the residential systems have been upgraded to Title 5. The Engineering Office and DPW have completed and corrected many stormwater runoff problems. A complete copy of the Swan River Study is attached as Appendix _____.

A series of Shellfish Sanitary Surveys have been completed and begun throughout the Town. Table 2.1.10 lists the areas of the surveys along with the dates and areas involved. The complete document can be found in Appendix _____.

**TABLE 2.1.10**
**SHELLFISH SANITARY SURVEY INFORMATION**

| AREA | I.D. NUMBER | DATE COMPLETED | ACREAGE |
|---|---|---|---|
| North Coastal | CCB:23 | 9/25/89, Reappraisal 8/14/92 | 12,015.8 acres |
| Chase Garden Creek | CCB:27 | 7/17/92 | 140.0 acres |
| Sesuit Harbor | CCB:25 | 2/94 | 45.5 acres |
| Quivett Creek | CCB:24 | Not Complete | 25.0 acres |
| South Coastal | SC:32 | 10/4/96 | 10,097.0 acres |
| Bass River south | SC:33 | 1/23/92 | 117.3 acres |
| Bass River central | SC:34 | 1/25/90 | 206.4 acres |
| Bass River north | SC:35 | 1/2/91, 4/16/94, 5/6/97 | 94.3 acres |
| Swan Pond and Swan Pond River | SC:36 | Not Complete | 180.0 acres |

Source: Shellfish Management Plan

There are no known areas that are experiencing problems with water quality or quantity from chemical contamination or saltwater intrusion.

## FRESH WATER SURFACE WATER BODIES

### Inventory

The town's primary freshwater resources are its ponds totaling over 240 acres of surface area. See Map 2.1.3. These ponds area scattered throughout the town, primarily in the geologic areas of outwash plan and glacial lake deposit. See Table 2.1.11.

**TABLE 2.1.11**

POND CHARACTERISTICS WITHIN THE TOWN OF DENNIS

| Pond Name | Surface Acreage | Max. Depth (ft.) | Shore Length (mi) | Activities | Access | Comments |
|---|---|---|---|---|---|---|
| **OFFICIAL GREAT PONDS**: (public; surveyed by state engineers) | | | | | | |
| Scargo Lake | 53 | 48 | 1.3 | Trout stocked, fishing, swimming; 7.5hp boating | Town ramp, beach | Herring run |
| **PRESUMED GREAT PONDS**: (public; surface area greater than 10 acres) | | | | | | |
| Fresh Pond | 29 | 8 | 0.95 | Skating, fishing, 5hp boating, walking trails | Rte 134 cons. area | Cedar swamp |
| Kelly's Pond | 25 | - | 0.95 | | Town Cons. Area | |
| Flax Pond | 15 | 29 | 0.52 | Swimming, fishing | Town cons. Area | |
| Grassy Pond | 12 | - | 0.76 | | Through wellfield | Rare plants |
| White's Pond | 12 | - | 0.47 | | No formal access | |
| Cedar Pond | 10 | - | 0.55 | Swimming, fishing | Airline Rd. town cons. | |
| Coles Pond | 10 | - | 0.53 | | No formal access | Rare plants |
| Eagle Pond | 10 | - | 0.38 | | Off Love Ln | |
| **PRIVATE PONDS WITH PUBLIC ACCESS:** (<10 acres, but publicly owned frontage or access | | | | | | |
| Run Pond | 9 | | 0.57 | | Through wellfield | Rare plants |
| Bakers Pond | 8 | | 0.50 | Fishing | Airline Rd. cons. Area | Rare plants |
| Aunt Patty's Pond | 8 | | 0.76 | | Through wellfield | Rare plants |
| Funn Pond | 5 | | 0.30 | | Through D. Pines GC | |
| Clay Pond | 5 | | 0.28 | | Through wellfield | Rare plants |
| N. Simmons Pond | 5 | | 0.37 | | Through wellfield | Rare plants |
| S. Simmons Pond | 5 | | 0.41 | | From N. Simmons Pond | Rare plants |
| Whittemores Pond | 3 | | 0.28 | | Through town cons. Area | |
| Cash Pond | 3 | | 0.3 | | Through wellfield | |
| Duck Pond | 1.76 | | 0.2 | | Through wellfield | |
| Baker's Pondlet | 0.75 | | 0.2 | | Through wellfield | |
| Tiny Pond | 0.5 | | 0.1 | | Through town cons area | |
| SE Grass Pond | 0.5 | | 0.1 | | Through wellfield near | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | S. Simmons Pd. | |
| NW Grass Pond | 0.4 | | 0.1 | | Through wellfield near N. Simmons Pd. | |
| The Plashes | | | | | Through town cons area | Manmade |
| Great Pond Plash | | | | | Through town cons. Area | Manmade |
| The Reservoir | | | | | Bound Brook Cons area | Manmade; herring run |
| **PRIVATE PONDS: (less than 10 acres; no public access; surrounded by private property)** | | | | | | |
| Shiverick Pond | 2 | | 0.2 | | Nordblom estate | |
| Hinckleys Pond | 1 | | 0.2 | | Off Hummel Dr. | |
| Unnamed pond | 0.4 | | 0.1 | | Off Mayfair Road | |
| Unnamed pond | 0.4 | | 0.1 | | Off Mayfair Road | |
| Little Coles Pond | 0.4 | | 0.1 | | Lampe Condos, con. to Coles Pond | |
| **HISTORICAL PONDS: (ponds no longer in existence due to filling)** | | | | | | |
| Duck Pond | -2.5 | | -0.3 | | Town landfill area | |
| TOTAL | 240+ acres | | 11.58 miles (does not include filled ponds) | | | |

Source: Original research, The Compact of Cape Cod Conservation Trusts, Inc., 1997, using town assessing records. And surveys, personal communication from Dennis Dept. of Natural Resources, and, University of Massachusetts, "An Inventory of the Ponds, Lakes and Reservoirs of Massachusetts: Barnstable County," 1969.

There are nine ponds that are greater than ten acres in size, which classifies them as Great Ponds of the Commonwealth. The public owns Great Ponds and is entitled to access, while other ponds can be owned privately by surrounding landowners and public access can be prohibited. Only one of Dennis' Great Ponds (Scargo Lake) has been officially surveyed as greater than ten acres in area by state engineers, but clearly others meet the test. Seventeen Ponds are private by size, but have public access through publicly owned land, primarily wellfields of the Dennis Water District around their shores.

Most of the ponds in Dennis are classic kettlehole ponds, formed on the Cape as deep depressions in the glacial outwash left by stagnant ice blocks. Most are isolated; that is they do not drain by brook into the sea. These ponds depend solely on the fluctuation in the aquifer's water table for their own surface level, often exposing a wide shore during the summer when the water table is low.

All of Dennis' waters are generally of high quality, though problem spots exist. All freshwater ponds are included in Class B, the top freshwater ranking for ponds, which are not used as a source of a public drinking water supply.

## ANALYSIS

As stated earlier, DEP has listed all the fresh water ponds in Class B. The ponds must be maintained at a high level of purity and are not supposed to be degraded by point source discharge, such as sewage outfalls. In fact, it is non-point sources of pollution (road runoff, septic systems, lawn maintenance, etc.) that are the more potent threat to water quality of ponds and bays in Dennis.

Eutrophication is the process by which a pond experiences algae blooms, oxygen depletion, fish kills, noxious odors and visual deterioration as a result of excessive nutrient inputs (usually from runoff and septic systems). Some of Dennis' smaller ponds may suffer from eutrophication, but no studies have yet been done to characterize these systems.

Freshwater ponds on the Cape tend to be naturally acidic due to a lack of alkaline materials in the soils, and accelerated acidification seems apparent in several ponds. Between 1983-85 the Acid Rain Monitoring Project (ARM), coordinated by the University of Massachusetts at Amherst, sampled 3370 surface waters throughout the state and found that 5.5 percent were acidified, 16.8 percent were critical, 20 percent were endangered and 21.7 percent were highly sensitive (in descending order of degradation.) Dennis was one of only 25 towns throughout the state (one of seven of the Cape) that ARM considered to be the most highly acidic. Ironically, the high acidity keeps the pond water attractive for swimming because the water looks very clear and feels "soft".

It is strongly recommended that the Town establish and appoint a Wastewater Management Committee. The Committee's charge would be to study and investigate all areas of the town, the existing and/or potential problems relative to waste water and the impacts that the waste water is having on ground water, fresh water and coastal embayments. The Committee would also be responsible for recommending courses of action the Town can take to mitigate these problems.

## GOALS AND POLICIES

The following Goals, Policies and Minimum Performance Standards establish guidance for the development of future regulatory changes within the Town of Dennis. These Goals, Policies and Minimum Performance Standards do not supercede existing town by-laws or regulations. Any regulatory changes will be developed by the responsible town boards and brought through the boards normal regulatory review process, including public hearings, etc.

**2.1.1 Goal**: To maintain the overall quality and quantity of Dennis', as well as Cape Cod's, ground water to ensure a sustainable supply of untreated high quality drinking water and to preserve and restore the ecological integrity of marine and fresh surface waters.

**Minimum Performance Standards** *

2.1.1.1 Except as otherwise specified in the classification system below, all development and redevelopment shall not exceed 5 ppm nitrogen loading standard for impact on ground water based on the methodology contained in Cape Cod Commission Nitrogen Loading Technical Bulletin 91-001.

2.1.1.2 All development and redevelopment shall comply with the minimum performance standards outlined in the following water resources classification system. If a property is located where two classifications overlap, the more stringent standards shall apply. The water resources classification system is illustrated on the Cape Cod Water Resources Classification Maps I and II, dated September 5, 1996, as amended and described below:

A: Wellhead Protection Areas: Consist of areas that contribute ground water to existing pubic and community water supply wells. These areas shall be delineated by a consistent method and recognized by the Commission in conjunction with state standards for Zone II's (as defined in 310 CMR 22.02).

A.1: The maximum loading standard for nitrogen impact on ground water shall be 5 ppm for development and redevelopment unless a cumulative impact analysis indicates a more stringent loading standard is necessary.

A.2: Commercial and industrial development and redevelopment that involves the use, treatment, generation, storage or disposal of hazardous wastes or hazardous materials, with the exception of household quantities, shall not be permitted.

A.3: Public and private sewage or septage treatment facilities shall not be permitted in these areas, except as provided in subsection E.2 below and subject to Section 2.1.2.1 through 2.1.2.7 of the Regional Policy Plan.

A.4: All Developments of Regional Impact within Wellhead Protection Areas shall use DEP approved alternative systems with enhanced nitrogen removal, unless a cumulative nitrogen loading assessment of the recharge area indicates that nitrogen loading from Title 5 systems is acceptable.

A.5: Uses prohibited in Zone II by state regulations shall not be permitted in these areas.

B. Fresh Water Recharge Areas: Consist of recharge areas to fresh water ponds as mapped by a method acceptable to the Commission.

B.1: In order to limit phosphorus inputs, no subsurface disposal systems shall be permitted within 300 feet of mean high water of fresh water ponds unless the applicant demonstrates by a ground water study that the site is not within the Fresh Water Recharge Area.

B.2: Development of Regional Impact that generate over 2000 gpd of sewage effluent may be required to delineate the ground water recharge areas to potentially affected fresh water ponds and conduct a phosphorous loading assessment in order to identify and mitigate adverse impacts.

B.3: Public and private sewage treatment facilities may be used within Fresh Water Recharge Areas subject to subsection E.2 and Section 2.1.2.1 through 2.1.2.7 below.

* These standards are not to supersede Board of Health Regulations.

C. Marine Water Recharge Areas: Consist of recharge areas to marine embayments as mapped by the Commission on Cape Cod Water Resources Classification Map II dated September 5, 1996, as amended:

C.1: Except as specified in subsection C.2 below, development and redevelopment shall not exceed identified critical nitrogen loading standards for impact on marine ecosystems. For watersheds where the critical nitrogen load has not been determined, Developments of Regional Impact shall be required to make a monetary contribution to determine the flushing rate of the embayments where the critical nitrogen loading rate has been identified, Developments of Regional Impact may be required to make a monetary contribution towards the development or implementation of appropriate nitrogen management strategies.

C.2: Where existing watershed development exceeds identified critical loading standards for a marine recharge area or where there are documented marine water quality problems in the associated embayment, development and redevelopment shall maintain or improve existing levels of nitrogen loading.

C.3: All Developments of Region Impact within Marine Water Recharge Areas shall use DEP approved alternative systems with enhanced nitrogen removal, unless a Commission-approved cumulative nitrogen loading assessment of the embayment and recharge area indicates that nitrogen loading from a standard Title 5 system is acceptable.

C.4: Public and private sewage treatment facilities may be used within Marine Water Recharge Areas subject o subsection E.2 and Section 2.1.2.1 through 2.1.2.7. below.

D. Impaired Areas: Consist of areas where ground water may have been degraded by point and nonpoint sources of pollution, including by not limited to areas with unsewered residential developments where lots, on average, are less then 20,000 sq. ft; landfills, septage and wastewater treatment plant discharge sites; high density commercial and industrial area and those downgradient areas where the ground water may have been degraded by these sources. For the purpose of these standards, all certified growth/activity centers shall be classified as Impaired Areas.

D.1: Development shall generally meet a 5 ppm nitrogen loading standard for impact on ground water, but may increase to a 10 ppm nitrogen loading standard where it can be demonstrated to the permitting authority that such increase will cause no significant adverse impact on ponds, wetlands, marine waters, public or private drinking water supply wells and potential water supply wells as identified in Section F below.

D. 2: Where existing development exceeds the 10 ppm nitrogen loading standard, development and redevelopment of that property shall not increase existing levels of nitrogen loading.

D.3: Public and private sewage treatment facilities, as well as other remediation measures such as community systems and DEP approved alternative systems with enhanced nitrogen removal shall be encouraged in Impaired Areas. Public and private sewage treatment facilities shall be subject to Sections 2.1.2.1 through 2.1.2.7 below.

D.4: The development of public or community water supply systems shall be encouraged for areas serviced by private wells in Impaired Areas.

E. Water Quality Improvement Areas: Consist of Impaired Areas that are located within Wellhead Protection Areas, Fresh Water and Marine Water Recharge Areas. In such areas improvement of water quality is a major goal.

E.1: Development shall not exceed a 5 ppm nitrogen loading standard or an identified marine water quality standard as applicable. Where existing development exceeds the identified loading standard or where there are documented marine water quality problems, development and redevelopment shall improve existing levels of nitrate-nitrogen loading.

E.2: Use of public and private sewage treatment facilities shall be as follows: within Water Quality Improvement Areas that are in Wellhead Protection Areas, public and private sewage treatment facilities may be used only to remedial existing problems; within Water Quality Improvement areas that are in Fresh Water and/or Marine Water Recharge Areas, public and private sewage treatment facilities may be used in conjunction with any development or redevelopment. All such facilities shall be subject to Sections 2.1.2.1 through 2.1.2.7 below.

F. Potential Public Water Supply Areas: Consist of potential public water supply areas that have been identified by the Commission on the Cape Cod Water Resources Classification Map I dated September 5, 1996, as amended, and future well sites and their associated recharge areas that have been identified by towns, water districts or private water companies.

F.1: No development shall be permitted within 400 feet of an identified future well site.

F.2: Within an identified Potential Public Water Supply Area, the same standards apply as in Wellhead Protection Areas above.

2.1.1.3 Developments and redevelopments shall identify their proposed wells and existing private wells on abutting properties within 400 feet and assess the impact of the development on the water quality of these wells. Septic systems and other sources of contamination shall be sited so as to avoid contamination of existing or proposed wells.

2.1.1.4 Conversion from seasonal to year-round uses in FEMA A flood zones or within 100 feet of wetlands shall not be permitted unless the proponent installs a DEP approved alternative system with enhanced nitrogen removal. The proponent must also demonstrate that the project will not have other adverse impacts on ground water or adjacent surface water areas and wetlands.

2.1.1.5 Developments and redevelopments that withdraw over 30,000 gallons of water per day shall be required to evaluate impacts on the water table and surface water bodies.

2.1.1.6 New direct discharge of untreated stormwater, parking lot runoff and/or wastewater into marine and fresh surface water and wetlands shall not be permitted. Stormwater shall be managed and disposed of on site. Development and redevelopment shall use best management practices such as vegetated swales, to minimize runoff and maximize water quality treatment. A maintenance schedule shall be developed for all drainage structures. Stormwater drainage should be based on projected 25 year-24 hour storm unless more conservative figures are required by town zoning by-laws.

**Other Development Review Policies**

2.1.1.7 Water withdrawals should be managed so that they do not adversely affect surface water resources, wetlands, private wells or the safe yield of the aquifer.

2.1.1.8 Development and redevelopment should make use of water conservation technologies.

2.1.1.9 Development and redevelopment should minimize the use of chemical fertilizers and pesticides.

2.1.1.10 Cleanup of chemical spill and contamination sites should be expedited.

**2.1.2 Goal**: To encourage the use of public and private sewage treatment facilities in appropriate areas where they will provide environmental or other public benefits and where they can be adequately managed and maintained.

**Minimum Performance Standards**

2.1.2.1 Private treatment facilities may be constructed only if there are no feasible public treatment facility options available or planning.

2.1.2.2 All public and private sewage treatment facilities shall be designed to achieve tertiary treatment with denitrification that meets a maximum 5 ppm total nitrogen discharge standard in the ground water at the down grading property line.

2.1.2.3 The construction of private sewage treatment facilities (PSTFs) shall not allow development to occur at a higher density than would be allowed by local zoning.

2.1.2.4 The construction of PSTFs shall be consistent with municipal capital facilities plans where they exist. Municipalities shall have the opportunity to assume ownership and maintenance responsibilities for such facilities where desired by the municipality.

2.1.2.5 PSTFs shall not be constructed in FEMA V zones and floodways, Areas of Critical Environmental Concern (ACECs), wetlands and buffer areas, barrier beaches, coastal dunes or critical wildlife habitat. PSTFs may be constructed in FEMA A zones only to remediate water quality problems from existing development within such A zones and consistent with Section 2.2.2.2 and Section 2.2.2.6, except as provided in Section 2.2.2.11.

2.1.2.6 The long-term ownership, operation, maintenance and replacement of PSTFs shall be secured as a condition of approval in accordance with Commission, state and local guidelines.

2.1.2.7 Applications for approval of public and private sewage treatment facilities shall include a plan for sludge disposal.

**Other Development Review Policies**

2.1.2.8 Towns may provide bonus provisions to allow increased development density through their local bylaws/ordinances provided that the development provides a substantial public benefit such as the provision of affordable housing substantially above the required 10%, or treatment of substantial amounts of sewage from existing non-sewered development.

2.1.2.9 When allowing additional development in areas where existing high density development or large numbers of faulty septic systems have led to public health or water quality problems, the Town may require PSTFs or DEP approved alternative systems with enhanced nitrogen removal to be installed as a remedial measure.

**Implementation**

1. The Town should establish a Waste Water Management Committee.
   Responsible Parties: BOS
   Priority: H
   Time Frame: 2002

2. The Town should continue marine water quality monitoring through volunteers and financial support of the Town.
   Responsible Parties: BOS
   Priority: H
   Time Frame for Completion: On-going

3. The Town should consider creating a shellfish revolving fund to provide financial support of shellfish enhancement programs.
   Responsible Parties: BOS
   Priority: H
   Time Frame for Completion: 2002

4. The Town should consider the designation of watershed areas contributing to the embayments of Bass River and Swan Pond as Nitrogen Sensitive Areas.
   Responsible Parties: BOS, BOH
   Priority: H
   Time Frame for Completion: On-going

5. The Town should develop and implement a program of water quality monitoring for the fresh waters of the Town.

Responsible Parties: BOS, BOH
Priority: M
Time Frame for Completion: 2003

6. The Town should declare all coastal waters as No Discharge Zones.
   Responsible Parties: BOS, CRC, WC, SC
   Priority: H
   Time Frame for Completion: 2001

7. The Town should establish a management plan for the Town Watershed areas.
   Responsible Parties: BOS, WD
   Priority: H
   Time Frame for Completion: 2002

8. The Town should develop an active public awareness program to encourage minimum use of fertilizers, herbicides and pesticides.
   Responsible Parties: CC, WD
   Priority: M
   Time Frame for Completion: On-going

9. The Town should consider adopting and enforcing regulations to limit development and redevelopment in FEMA V Zones.
   Responsible Parties: CC, PB, BC
   Priority: M
   Time Frame for Completion: 2003

10. The Town should identify and have certified all vernal pools located within the Town to ensure their proper regulation by the Conservation Commission.
    Responsible Parties: CC
    Priority: H
    Time Frame for Completion: 2002

11. The Town should consider adopting a regulation that will require waterfront property owners to plant only native species within 50 feet of a resource area.
    Responsible Parties: CC
    Priority: M
    Time Frame for Completion: On-going

12. The Town should explore and evaluate methods and the cost of programs to eradicate non-native species.
    Responsible Parties: CC
    Priority: L
    Time Frame for Completion: On-going

13. The Town should continue to protect Zones of Contribution of the public water supply through programs of land acquisition.

Responsible Parties: LAC, WD
Priority: H
Time Frame for Completion: On-going

14. The Town should develop a minimum use program for fertilizers, pesticides, and herbicides on all Town owned properties.
    Responsible Parties: DPW, Golf, REC, DYS
    Priority: M
    Time Frame for Completion: 2001

15. The Town should develop water conservation plans that encourage the installation and use of water saving devices.
    Responsible Parties: WD
    Priority: H
    Time Frame for Completion: On-going

16. The Town should identify locations of private wells and septic systems especially in densely developed areas and undertake inspection and improvement programs for upgrading pre-Title 5 and failing septic systems.
    Responsible Parties: BOH
    Priority: H
    Time Frame for Completion: On-going

17. The Town and the Water District should continue to map, protect and acquire needed future water supply areas.
    Responsible Parties: WD, LAC
    Priority: H
    Time Frame for Completion: On-going

18. The Town should continue its efforts in developing local bylaws or regulations to provide for regular maintenance and pump-out of individual septic systems and funding sources to assists in this work.
    Responsible Parties: BOH, BOS
    Priority: H
    Time Frame for Completion: 2003

19. The Town should continue to enforce local bylaws or regulations limiting nitrogen loading to protect ground and surface water quality.
    Responsible Parties: BOH, CC, PB
    Priority: H
    Time Frame for Completion: On-going

20. The Town should establish or modify local water supply protection bylaws to prohibit hazardous land uses in Wellhead Protection Area.
    Responsible Parties: PB, WD, BOH
    Priority: H

Time Frame for Completion: Completed (Board of Health Regs.)

21. The Town should develop snow removal management strategies for roadways that minimize the total application and other harmful deicing chemicals.

Responsible Parties: DPW
Priority: M
Time Frame for Completion: 2002

22 Town should evaluate future build-out scenarios to determine the impacts of different zoning recommendations on water supply and water demand.

Responsible Parties: PB

Priority: M
Time Frame for Completion: Ongoing

23 The town will work with the Cape Cod Commission and UMASS-Dartmouth School of Marine Science and Technology (SMAST) on coastal water quality issues.

Responsible Parties: CC, SC, CRC, BOH, BOS

Priority: M
Time Frame for Completion: Ongoing

24 The town will continue and expand its freshwater monitoring efforts with the assistance of the Commission.

Responsible Parties: CC, SC, CRC

Priority: M
Time Frame for Completion: Ongoing

25 The town will continue to explore and develop alternative septic/sewage strategies to meet water quality needs, especially within the proposed growth centers.

Responsible Parties: BOH, PB, BOS

Priority: M
Time Frame for Completion: Ongoing

26. The town will work to develop solutions to chronic septic problems in Dennisport.

Responsible Parties: BOH, BOS

Priority: M
Time Frame for Completion: Ongoing

Abbreviations:

| | | | |
|---|---|---|---|
| BC | Building Commissioner | LAC | Land Acquisition Committee |
| BOH | Board of Health | PB | Planning Board |
| BOS | Board of Selectmen | REC | Recreation Commission |
| CC | Conservation Commission | SC | Shellfish Commission |
| CRC | Coastal Resources Committee | WC | Waterways Committee |
| DPW | Department of Public Works | WD | Dennis Water District |
| DYS | DY School District | | |