Prepared in cooperation with the
Massachusetts Department of Environmental Protection

Estimated Hydrologic Budgets of Kettle-Hole Ponds in Coastal Aquifers of Southeastern Massachusetts

Scientific Investigations Report 2011–5137

U.S. Department of the Interior
U.S. Geological Survey

Cover. Photograph of Ashumet Pond, shot from helicopter by Denis R. LeBlanc, U.S. Geological Survey.

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KEN SALAZAR, Secretary

U.S. Geological Survey
Marcia K. McNutt, Director

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Conversion Factors and Datum

Multiply	By	To obtain
	Length	
inch (in.)	2.54	centimeter (cm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
	Area	
acre	0.4047	hectare (ha)
	Flow rate	
cubic foot per day (ft^3/d)	0.02832	cubic meter per day (m^3/d)
inch per year (in/yr)	25.4	millimeter per year (mm/yr)
	Hydraulic conductivity	
foot per day (ft/d)	0.3048	meter per day (m/d)

Vertical coordinate information is referenced to the National Geodetic Vertical Datum of 1929 (NAVD 29).

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 83).

Altitude, as used in this report, refers to distance above the vertical datum.

List of Acronyms

MassDEP	Massachusetts Department of Environmental Protection
USGS	U.S. Geological Survey
TMDL	Total maximum daily loads

Estimated Hydrologic Budgets of Kettle-Hole Ponds in Coastal Aquifers of Southeastern Massachusetts

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Abstract

Kettle-hole ponds in southeastern Massachusetts are in good hydraulic connection to an extensive coastal aquifer system that includes the Plymouth-Carver aquifer system on the mainland and aquifers underlying Cape Cod. The ponds receive water from, and contribute water to, the underlying glacial aquifer; ponds also receive water from precipitation and lose water to evaporation from the pond surface. Some ponds are connected to surface-water drainage systems and receive water from or contribute water to streams or adjacent wetlands. The Massachusetts Department of Environmental Protection currently (2011) is developing Total Maximum Daily Loads of phosphorus for the freshwater ponds in the region to maintain the health of pond ecosystems; the amounts and sources of water fluxes into and out of the ponds are important factors in determining the amount of phosphorus that can be assimilated into a pond. To assist in this effort, the U.S. Geological Survey used groundwater-flow models of the coastal aquifer system to estimate hydrologic budgets—including inflows and outflows from the aquifer system and adjacent streams and wetlands, and recharge from precipitation—for 425 ponds in southeastern Massachusetts.

Water fluxes through the ponds are a function of several factors, including the size, shape, and bathymetry of the pond, orientation of the pond relative to the regional hydraulic gradient, and hydrologic setting relative to the proximity of groundwater divides and discharge boundaries. Total steady-state fluxes through the ponds range from more than 3,300,000 to less than 2,000 cubic feet per day. For ponds without surface-water inlets or outlets, groundwater inflow accounts for 98 to 3 percent of total inflow; conversely, recharge onto the pond surface accounts for the remainder of inflow (between 2 and 97 percent). All natural flows from these ponds are through recharge from the pond into the aquifer. In one pond, about 94 percent of the total outflow is removed for water supply. For ponds that are connected to surface-water drainages, most inflow and outflow are through streams. Ponds that receive water from streams receive most (58 to 89 percent) of their water from those streams. Ponds that are drained by streams lose between 5 and 100 percent of their water to those streams.

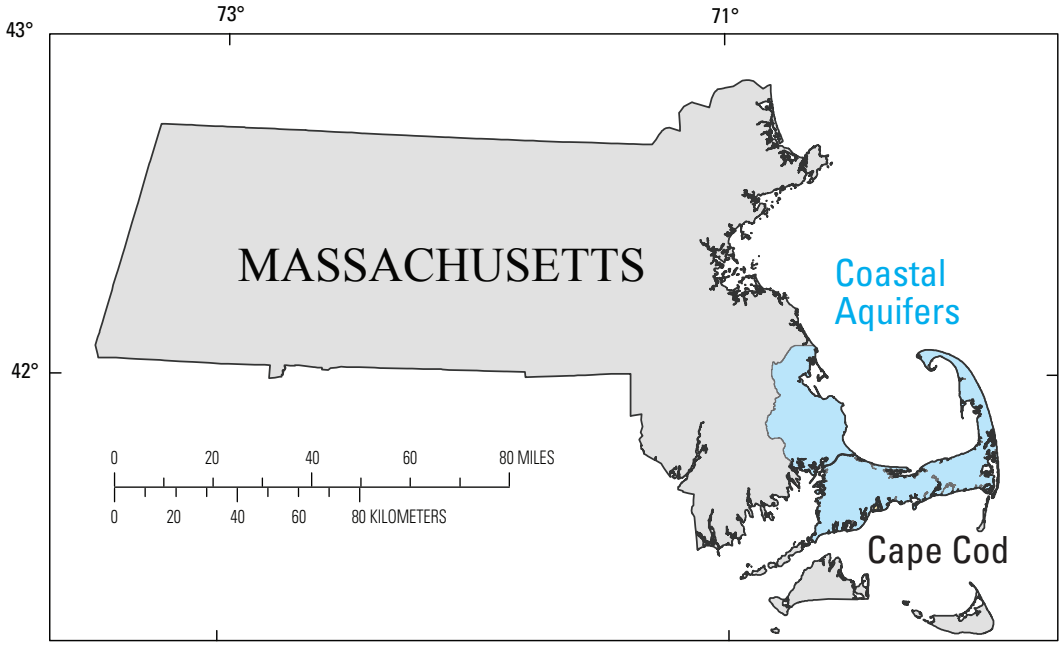
Introduction

The coastal plain of southeastern Massachusetts, including Cape Cod, contains numerous freshwater ponds that are important ecological and recreational resources for the region. The ponds, known as kettle-hole ponds, (1) are in hydraulic connection with the underlying coastal aquifers and (2) receive water from and contribute water to the aquifers. Many ponds also are connected to surface-water drainages and can receive water from and contribute water to streams and adjacent wetlands. The ponds receive water from recharge, which is the net difference between precipitation and evaporation, and water is withdrawn from some ponds for municipal water supply.

Nutrients, such as phosphorus, can be introduced into a pond from onsite septic disposal and agricultural activities within the watershed of the pond. Excess concentrations of phosphorus can contribute to the process of eutrophication, which can adversely affect water quality, clarity, and the ecological health of the ponds. The Massachusetts Department of Environmental Protection (MassDEP) currently (2009) is assessing the vulnerability of the region's ponds to eutrophication by developing Total Maximum Daily Loads (TMDLs) of phosphorus for the ponds. The volume of water entering and leaving a pond and the mechanisms by which water flows into and out of a pond (groundwater and (or) surface water) are important factors affecting the susceptibility of a pond to phosphorus-induced eutrophication. In 2008, the U.S. Geological Survey (USGS) developed hydrologic budgets for steady-state conditions for 425 ponds within the coastal aquifers of southeastern Massachusetts, including Cape Cod (fig. 1), to assist MassDEP in establishing TMDLs of phosphorus for ponds in the region. These budgets include estimates of pond inflows and outflows through recharge, surface water, groundwater, and production wells.

Purpose and Scope

The purpose of this report is to document analyses performed by the USGS in support of MassDEP efforts to develop TMDLs of phosphorus in ponds located in the coastal



Base from U.S. Geological Survey digital data, Universal Transverse Mercator projection, Zone 19, 1:24,000, 1991

Figure 1. Locations of coastal aquifers in southeastern Massachusetts.

aquifers of southeastern Massachusetts. The report includes discussions of the hydrologic settings of kettle-hole ponds located in coastal aquifers and of the individual components of the hydrologic budgets of the ponds. Estimated hydrologic budgets for 425 ponds are presented in data tables, grouped by aquifer (table 1, in back of report); index maps with topographic bases are presented to show the locations of individual ponds (appendix 1).

Hydrogeology of Southeastern Massachusetts

The coastal areas of southeastern Massachusetts are underlain by unconsolidated glacial sediments deposited during the Pleistocene Epoch between 15,000 and 16,000 years ago. The sediments, which range in thickness from near 0 adjacent to bedrock outcrops in the northwest part of the Plymouth-Carver area to more than 900 ft beneath eastern parts of Cape Cod, consist of gravel, sand, silt, and clay deposited in a variety of depositional environments beneath or near the edge of a continental ice sheet (Oldale and O'Hara, 1984; Uchupi and others, 1996). Much of the sediment was deposited in fluvial and lacustrine environments associated with deltas in proglacial meltwater lakes (Oldale, 1992). These deltaic sediments are characterized by coarse-grained sand and gravel deposited within meltwater streams underlain by sand deposited in nearshore lacustrine sediments. These sandy sediments are, in turn, underlain by fine-grained silt and clay deposited in offshore lacustrine environments (Oldale and O'Hara, 1984). The deltaic sediments are bounded laterally by moraine and kame deposits (Oldale and Barlow, 1986). Moraines were deposited at or near the ice edge by melting ice, and kame deposits were deposited by meltwater within holes in the ice sheets. Collapse structures are important geologic features of southeastern Massachusetts and Cape Cod. Remnants of glacial ice were buried by meltwater sediments following retreat of the ice sheets. As the buried ice blocks melted, the overlying glacial sediments collapsed forming topographic depressions within outwash plains; in some cases water then filled the depressions, forming kettle-hole ponds.

The glacial sediments underlying coastal areas of southeastern Massachusetts compose important regional aquifers. These aquifers are the sole sources of potable water to local communities, and groundwater flow supports aquatic ecosystems in the streams, ponds, and coastal waters of the area. The regional aquifers include the Plymouth-Carver aquifer on the Massachusetts mainland and aquifers underlying Cape Cod (fig. 2). Southeastern Massachusetts receives about 45 in. of precipitation annually; about one-half of the precipitation is lost to evapotranspiration, and the other half recharges the aquifer at the water table (LeBlanc and others, 1986). Groundwater flows away from water-table highs (regional groundwater divides) toward discharge locations in streams and coastal waters. The Plymouth-Carver aquifer is a single aquifer system; water-table altitudes in the aquifer range from about 130 ft above the National Geodetic Vertical Datum 1929 (NGVD 29) near the regional water-table divide to near NGVD 29 at the coast (Masterson and others, 2009) (fig. 2).

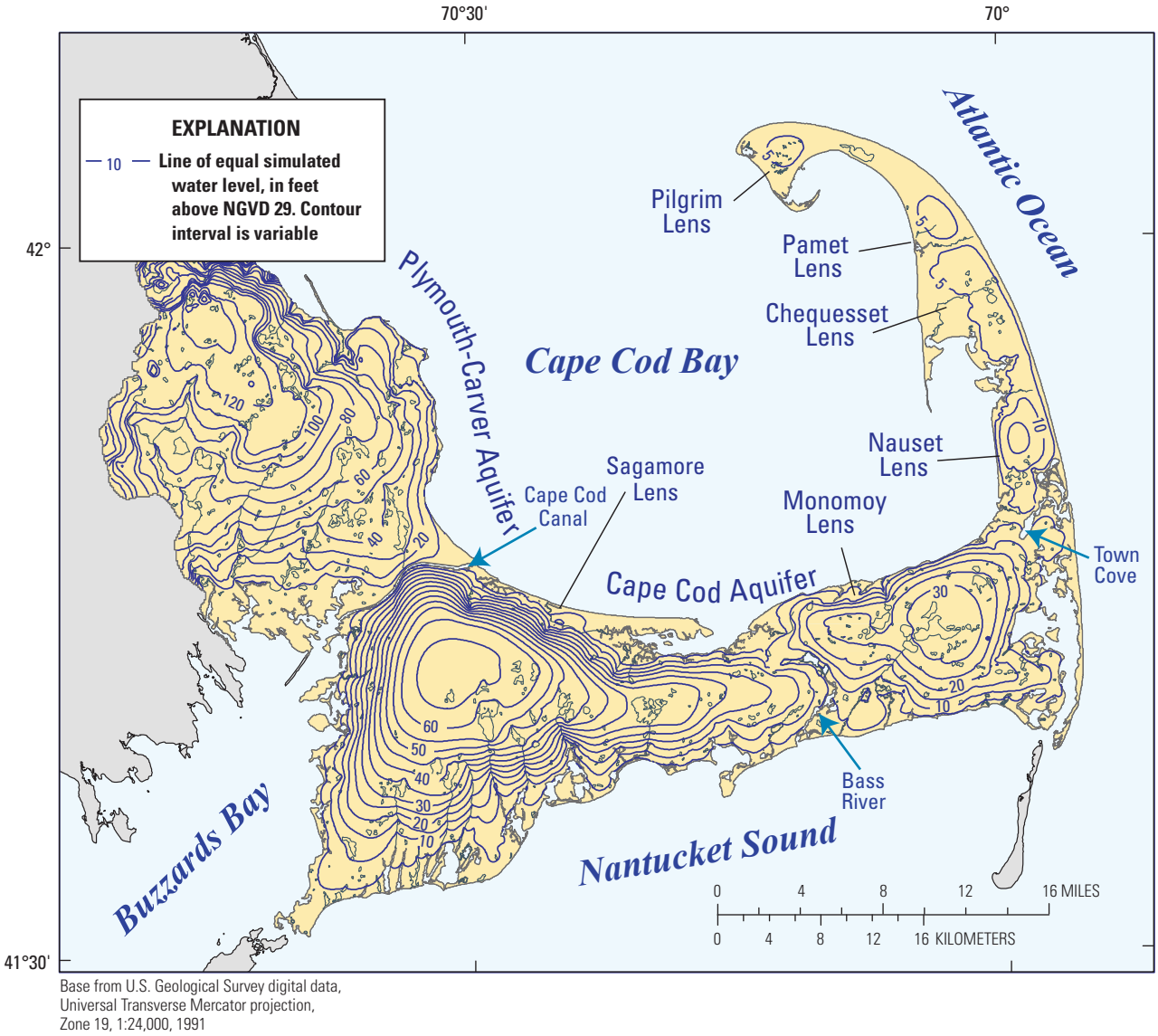


Figure 2. Water-table altitudes in the Plymouth-Carver and Cape Cod aquifer systems, southeastern Massachusetts.

The aquifers underlying Cape Cod comprise six distinct flow lenses: the Sagamore, Monomoy, Nauset, Chequesset, Pamet, and Pilgrim flow lenses (LeBlanc and others, 1986) (fig. 2). The flow lenses are separated by substantial saltwater boundaries into separate flow systems. In this analysis, the aquifers underlying Cape Cod are included in three separate systems: the Sagamore aquifer (Sagamore flow lens), the Monomoy aquifer (the Monomoy lens), and the Lower Cape aquifer (the Nauset, Chequesset, Pamet, and Pilgrim flow lenses). The highest water-table altitudes in the Sagamore, Monomoy, and Lower Cape aquifers are about 70, 35, and 15 ft, respectively (Walter and Whealan, 2004; Masterson, 2004) (fig. 2).

Kettle-hole ponds generally are in good hydraulic connection with the underlying coastal aquifers. Groundwater both enters and leaves the ponds and, as a result, three-dimensional groundwater-flow patterns are locally affected by ponds (Walter and Masterson, 2002). Because ponds are areas with little resistance to flow, contours of water-table altitudes bend around ponds and flow lines converge toward ponds in upgradient areas and diverge from ponds in downgradient areas (fig. 2). Vertical gradients are upward upgradient of ponds where ponds capture water from deeper in the aquifer and downward downgradient of ponds where ponds recharge the aquifer (fig. 3). Factors that affect the flux, or amount of groundwater flowing through a pond, include (1) the surface area, shape, and depth of the pond, (2) the location of the pond relative to regional groundwater divides and discharge locations in streams and coastal waters, and (3) the permeability of pond-bottom sediments (Walter and

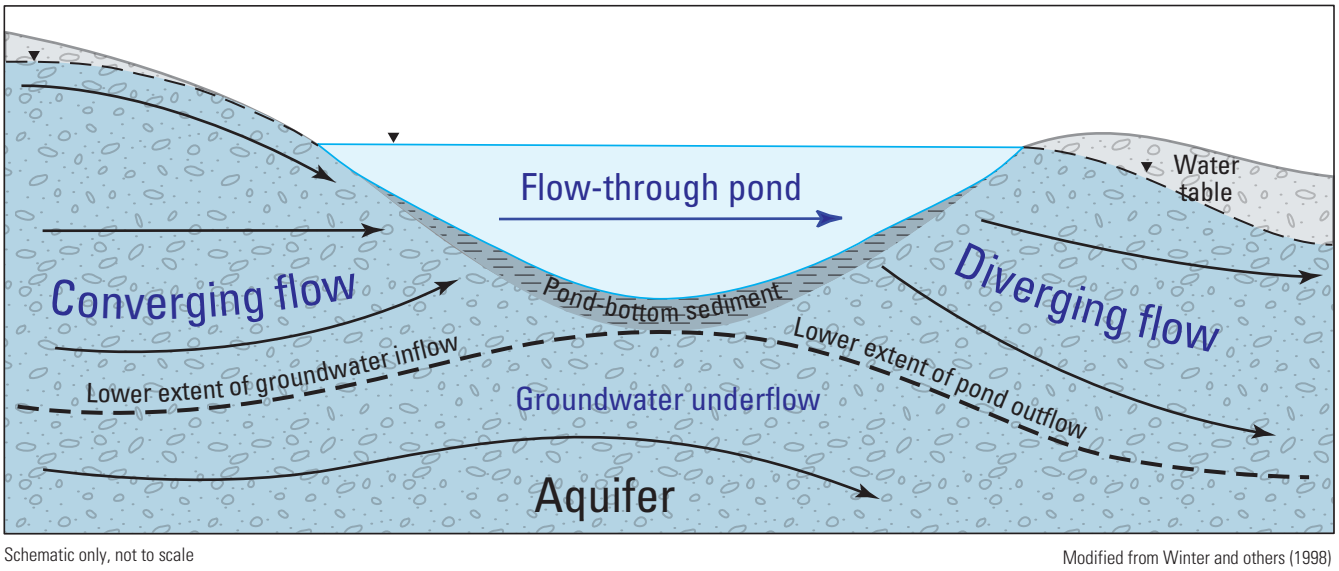


Figure 3. Vertical groundwater-flow paths upgradient and downgradient from kettle-hole ponds typical of those found in coastal aquifers of southeastern Massachusetts.

Masterson, 2002; Winter and others, 1998). For a given size and shape, ponds away from regional groundwater divides and closer to discharge boundaries or underlain by more permeable sediments generally would transmit larger fluxes of groundwater. Many ponds exchange water only with the aquifer; however, some ponds also exchange water with adjacent streams and wetlands. Some ponds have only outlets to surface waters, whereas other ponds have both inlets and outlets. Precipitation exceeds evaporation in southeastern Massachusetts, so ponds receive a net inflow from recharge. In addition to natural outflow, water is pumped from some ponds for water supply.

Methods of Analysis

Hydrologic budgets were estimated for 425 ponds by using existing numerical models of the four regional aquifers of southeastern Massachusetts and Cape Cod: the Plymouth-Carver, Sagamore, Monomoy, and Lower Cape Cod aquifer systems (fig. 4). Based on the U.S. Geological Survey finite-difference modeling code MODFLOW (Harbaugh and others, 2000; McDonald and Harbaugh, 1988), the models were designed during previous investigations between 2004 and 2008 to simulate the groundwater-flow systems of the regional aquifers and are documented in detail in USGS publications. The regional models of the Sagamore and Monomoy flow lenses are documented in Walter and Whealan (2004), the regional model of the Lower Cape Cod aquifer system (consisting of the Nauset, Chequesset, Pamet, and Pilgrim flow lenses) is documented in Masterson (2004), and the regional model of the Plymouth-Carver aquifer is documented in Masterson and others (2009). These publications include detailed discussions of the geology and hydrology of the respective aquifer systems and document model inputs, including boundary conditions, aquifer properties, and hydraulic stresses. The reports also discuss model calibration, including hydraulic data used for calibration and the agreement between observed and simulated hydrologic conditions.

Ponds were represented as regions of the aquifer with hydraulic conductivity (50,000–100,000 ft/d) much higher than the hydraulic conductivity of aquifer sediments (10 and 350 ft/d). Representing ponds as zones of high hydraulic conductivity results in a modeled pond-aquifer system that behaves the same as the natural system; flow lines converge toward the pond in upgradient areas and diverge from the pond in downgradient areas. Generally ponds less than 3.7 acres in area were excluded; given the model discretization of 400 ft, those ponds would consist of only a single model cell. The Stream Package (Prudic, 1989) was used to represent ponds with surface-water inlets or outlets as a head-dependent boundary condition. Stream boundaries were coincident with one or more model cells that represented ponds. The boundary altitude was set to the simulated level of the pond, and a very high (essentially infinite) boundary leakance was specified. The result was a simulated condition in which the pond received water from or discharged water to the stream, and the volume of water discharged was a function of the simulated pond level. Recharge onto the pond surface was simulated by the RCH Package (McDonald and Harbaugh, 1988) as a specified flux of water onto the pond surface at a recharge rate of about 16 in/yr representing the estimated net difference between regional precipitation and evaporation. Withdrawals

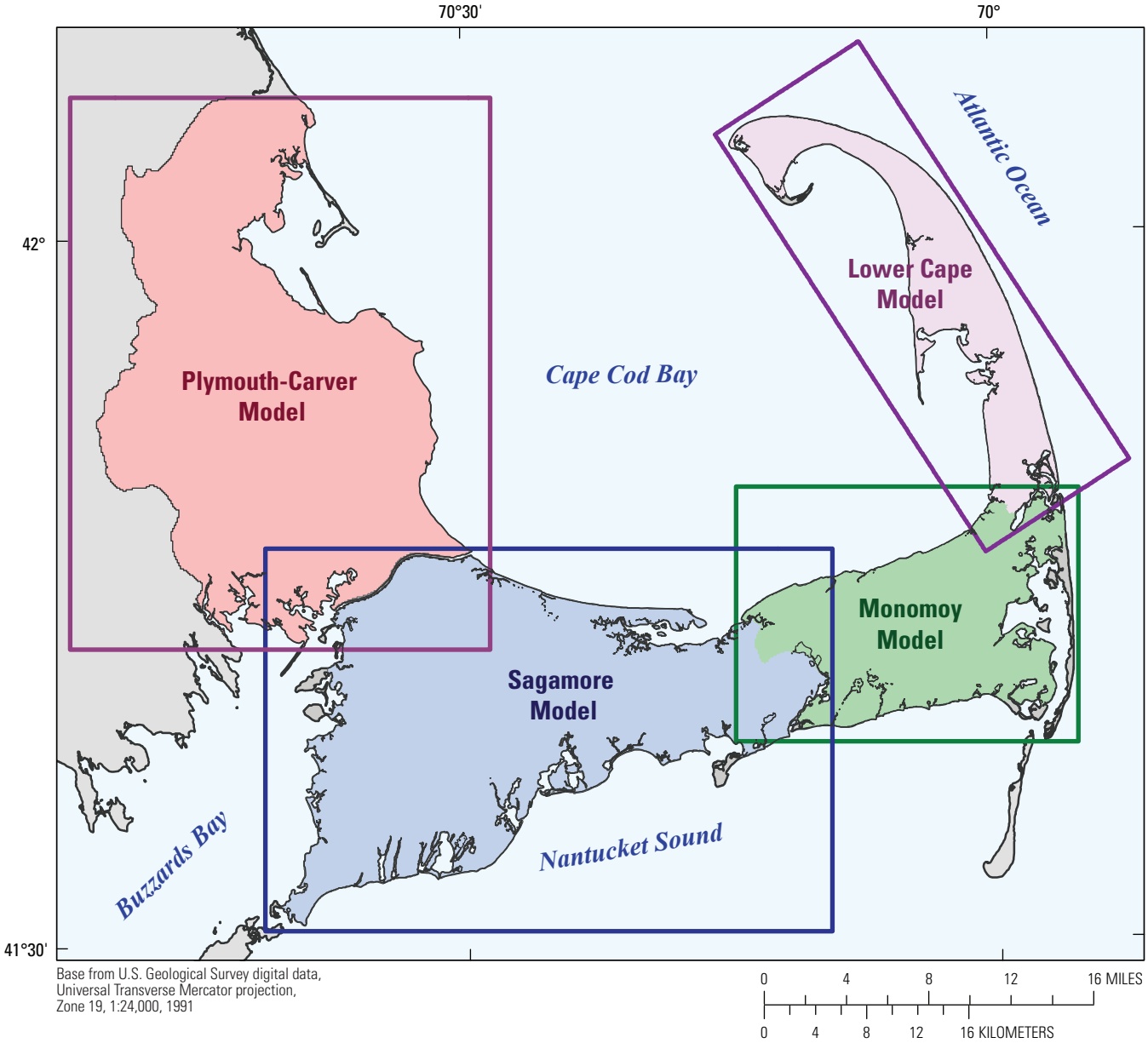


Figure 4. Extents of four regional models of coastal aquifers in southeastern Massachusetts: the Plymouth-Carver, Sagamore, Monomoy, and Lower Cape aquifers on Cape Cod.

of water for public supply were simulated as a specified flux by the WEL Package (McDonald and Harbaugh, 1988). The pumping rates and locations in this analysis generally represent current (2003–08) conditions and are documented in detail in Masterson and others (2009), Masterson (2004), and Walter and Whealan (2004). Steady-state conditions were assumed in which recharge and pumping stresses were averaged and constant over time; hydrologic budgets for the ponds, therefore, represented average inflows and outflows.

The models representing the Plymouth-Carver and Lower Cape Cod aquifers are the same as those documented in Masterson and others (2009) and Masterson (2004). The models of the Sagamore and Monomoy aquifers (Walter and Whealan, 2004) were modified from their original versions as part of this analysis. Hydrologic boundary conditions, water-transmitting properties of aquifer sediments, and hydraulic stresses were identical to those documented in Walter and Whealan (2004); however, areas of the models that represent ponds—as zones with essentially infinite hydraulic conductivity—were modified to better match actual conditions (fig. 5). In the Sagamore model, 16 new ponds were added, and 11 ponds were modified (fig. 5A); in the Monomoy model, 5 new ponds were added and 10 ponds were modified (fig. 5B).

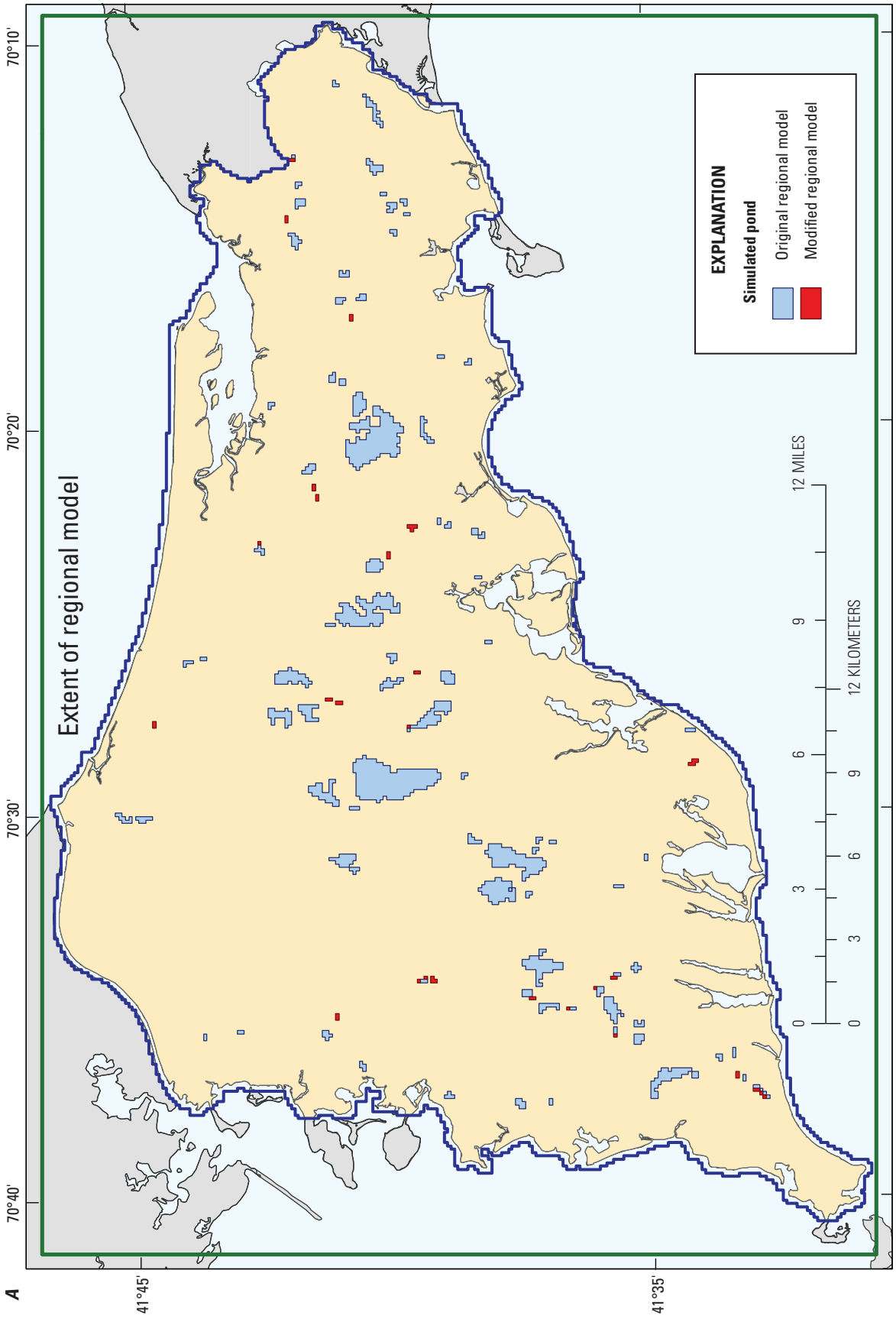
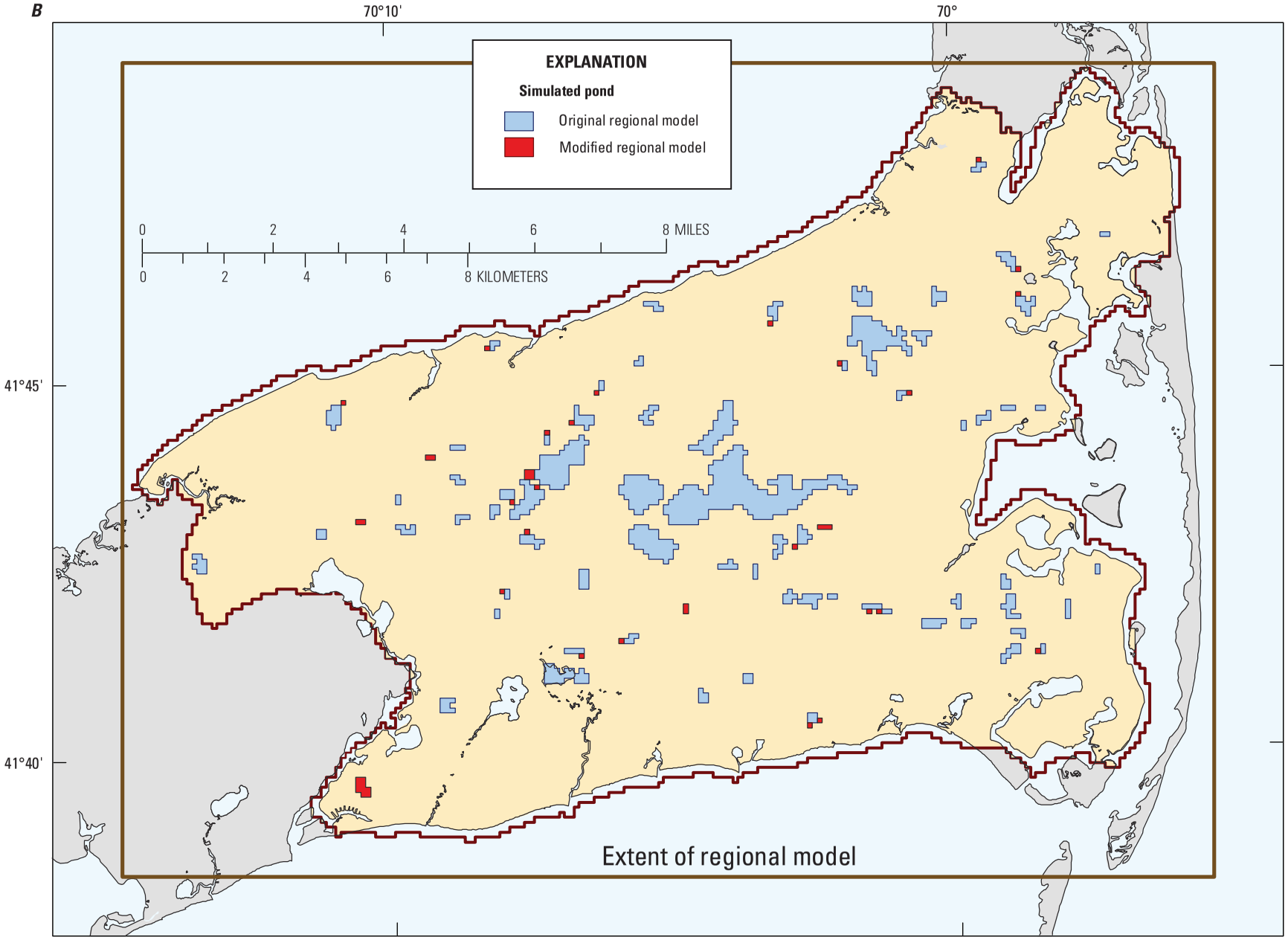


Figure 5. Modifications to simulated ponds in the *A*, Sagamore and *B*, Monomoy regional models between the versions documented in Walter and Whealan (2004) and the versions used to estimate pond fluxes.



Base from U.S. Geological Survey digital data, Universal Transverse Mercator projection, Zone 19, 1:24,000, 1991

Figure 5. Modifications to simulated ponds in the *A,* Sagamore and *B,* Monomoy regional models between the versions documented in Walter and Whealan (2004) and the versions used to estimate pond fluxes.—Continued

Hydrologic budgets for ponds were estimated by using the USGS program ZONEBUDGET (Harbaugh, 1990). This program uses cell-by-cell flows calculated by MODFLOW to estimate hydrologic budgets for user-defined subregions of the model domain. For this analysis, the program was used to estimate hydrologic budgets for each zone that represented a pond within the models. The program calculates water exchange between the pond and the surrounding model cells (groundwater inflow and outflow) as well as between the pond and head-dependent boundaries (stream inflow and outflow); the program also accounts for water that enters the pond as recharge and water that is withdrawn from wells.

Estimated Hydrologic Budgets

The hydrologic budget of a pond is defined as the sum of individual flow components entering and leaving the pond. Inflows to the simulated ponds are (1) inflow from the aquifer (groundwater inflow), (2) inflow from a stream (stream inflow), and (3) precipitation onto the pond surface (fig. 6). Outflows from the simulated ponds are (1) outflow into the aquifer (groundwater outflow), (2) outflow into a stream (stream outflow), (3) evaporation from the pond surface, and (4) withdrawals from pumped wells within the pond (fig. 6). The sum of all inflows equals the sum of all outflows (equation 1):

$$\overset{\text{IN}}{Q_{\text{groundwater}} + Q_{\text{stream}} + Q_{\text{precipitation}}} = \overset{\text{OUT}}{Q_{\text{groundwater}} + Q_{\text{stream}} + Q_{\text{evaporation}} + Q_{\text{wells}}} \qquad (1)$$

Recharge is defined as the difference between precipitation and evaporation. Because precipitation exceeds evaporation in this region, recharge is a net flow into the pond.

Equation 1 is based on steady-state-flow conditions, in which recharge and pumping stresses are constant through time. Total inflows are equal to total outflows, and there is no change in storage within the pond. If stresses change through time, inflows and outflows would not be equal, and the difference would be the result of a change in storage in the pond. In this analysis, the steady-state pumping and recharge stresses represented average annual rates as discussed in Masterson and others (2009), Masterson (2004), and Walter and Whealan (2004).

Water Fluxes Into and Out of Ponds

Water fluxes through the ponds are a function of several factors. The physical characteristics that determine total water fluxes through the pond include the surface area, volume, and bathymetry of the pond, as well as the shape and orientation of the pond relative to the regional hydraulic gradient. Another important factor is the hydrologic setting of the pond relative to groundwater divides and discharge boundaries. In areas near a regional groundwater divide, where hydraulic gradients are small, a pond with a given set of physical characteristics generally would have a smaller water flux than a similar pond in an area close to discharge boundaries (streams and coastal waters) with steep hydraulic gradients. Another factor affecting water fluxes through a pond is the hydraulic conductivity of pond-bottom sediments. Walter and Masterson (2002) found that fluxes through a pond can differ threefold

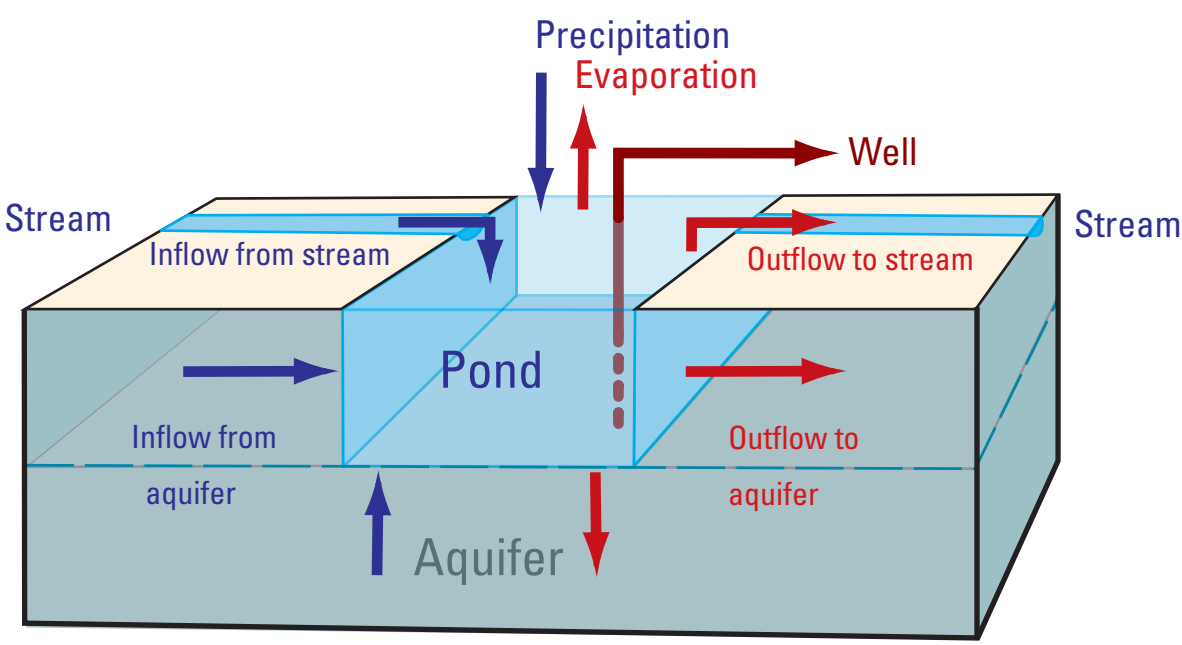
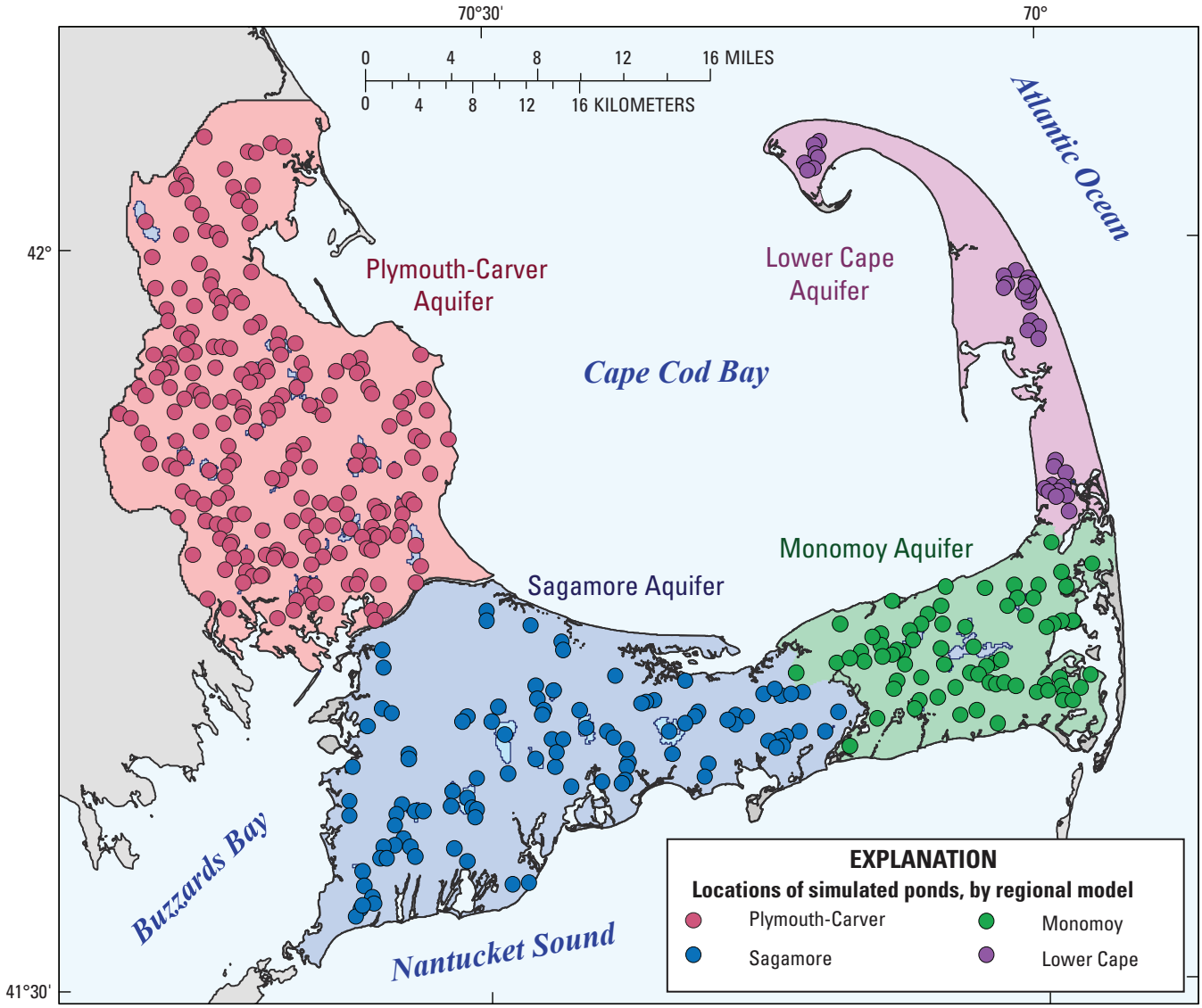


Figure 6. Schematic diagram of hydrologic-budget components (inflows and outflows) to and from kettle-hole ponds in coastal aquifers of southeastern Massachusetts.

over a range of pond-bottom hydraulic conductivities from silt and clay to sand and gravel. In the regional models used for this analysis, pond-bottom sediments in nearshore areas, where most pond-aquifer water exchange occurs, were assumed to be sandy with relatively high hydraulic conductivities, resulting in a good hydraulic connection with the aquifer.

Hydrologic budgets were estimated for 425 ponds in the four modeled aquifers (table 1, in back of report): 218 in the Plymouth-Carver aquifer, 101 in the Sagamore aquifer, 72 in the Monomoy aquifer, and 34 in the Lower Cape aquifer (fig. 7; table 2). The names, locations, and sizes of the ponds are presented in appendix 1. Of the 218 simulated ponds in the Plymouth-Carver aquifer, 86 have surface-water inflows or outflows. Of these ponds, 47 have surface-water outflows only, 8 have inflows only, and 30 have both surface-water inflows and outflows (table 2). The remaining 132 ponds have no surface-water inflows or outflows and receive water only from recharge and groundwater inflow. The Sagamore, Monomoy, and Lower Cape aquifers have a total of 13, 6, and 2 ponds, respectively, with surface-water outflows; only 2 of these ponds, both in the Monomoy aquifer, also have surface-water inflows (table 2). Water is withdrawn for water supply from 1 pond each in the Sagamore and Plymouth-Carver aquifers. The Sagamore, Monomoy, and Lower Cape aquifers have a total of 87, 66, and 32 ponds, respectively, that receive water only from recharge and groundwater inflow with no surface-water inflows or outflows (table 2). The sizes of the simulated ponds range from 3.7 to 841.1 acres. The areas of the largest



Base from U.S. Geological Survey digital data, Universal Transverse Mercator projection, Zone 19, 1:24,000, 1991

Figure 7. The locations of ponds in coastal aquifers of southeastern Massachusetts for which hydrologic budgets were estimated by regional models of the Plymouth-Carver, Sagamore, Momomoy, and Lower Cape Cod aquifer systems.

Table 2. Number of ponds simulated in each of the four coastal aquifers and types of surface-water inflows and outflows and pumping from wells.

[Groundwater inflow and outflow occurs in all ponds; Max is maximum surface area, Min is minimum surface area]

Modeled aquifer system	No surface-water flows or pumping	Stream outflow only	Stream inflow only	Stream inflow and outflow	Stream outflow and pumping	Pumping only	Total number of ponds	Modeled surface area of pond, in acres	
								Max	Min
Plymouth-Carver Aquifer	132	47	8	30	1	0	218	786.0	7.4
Sagamore Aquifer	87	13	0	0	0	1	101	639.1	3.7
Monomoy Aquifer	66	4	0	2	0	0	72	841.1	7.4
Lower Cape Aquifer	32	2	0	0	0	0	34	117.5	3.7

ponds in the Plymouth-Carver, Sagamore, Monomoy, and Lower Cape aquifers are 786.0, 639.1, 841.1, and 117.5 acres, respectively (table 2).

The total pond fluxes ranged from 3,315,660 cubic feet per day (ft^3/d)—through Glen Charlie Pond in the Plymouth-Carver aquifer (identifier 220 in table 1, in back of report)—to 1,196 ft^3/d at Simmons Pond in the Monomoy aquifer (identifier 33 in table 1, in back of report). The largest pond fluxes in the Sagamore, Monomoy, and Lower Cape aquifers were about 870,030; 517,805; and 68,488 ft^3/d, respectively (table 3). In the Plymouth-Carver, Sagamore, and Monomoy aquifers, the ponds with the largest fluxes have surface-water inflows and outflows. Ponds with surface-water inflows or outflows generally had higher total water fluxes than ponds that exchange water only with the underlying aquifer. The largest water fluxes through ponds in the Plymouth-Carver, Sagamore, Monomoy, and Lower Cape aquifers that have surface-water inflows or outflows were 3,315,660; 870,030; 517,805; and 57,854 ft^3/d, respectively (table 3). The largest pond fluxes in the aquifers that do not have surface-water inflows or outflows were 619,120; 434,660; 213,130; and 68,488 ft^3/d, respectively (table 3).

For ponds that have surface-water inflows or outflows, direct recharge, groundwater inflow, and inflow from streams were the sources of inflow; water left the ponds as outflow into streams, recharge of pond water into the aquifer, and, in one case, well withdrawals. For ponds that received water from streams, surface water was the largest component of inflow; surface-water inflow into these ponds ranged from 88.9 to 58.4 percent of total inflow (table 3). The percentage of total inflow from groundwater in these ponds ranged from 98.3 to 9.6 percent. Recharge, generally a small component of water fluxes through ponds, ranged from 34.1 to 0.8 percent. The percentage of total outflow through streams ranged from 100 to 4.5 percent (table 3). Conversely, groundwater outflow from ponds into the aquifer ranged from 95.5 to 0 percent as a percentage of total outflow. About 34.7 percent of total outflow was withdrawn for water supply from one pond.

For ponds that do not have surface-water inflows or outflows, recharge and groundwater are the sole sources of inflow, and recharge of pond water into the aquifer is the sole component of outflow from the pond (fig. 6; table 3). The percentage of groundwater inflow, expressed as the percentage of total inflow, in these ponds ranged from 98.2 to 3.1 percent; the percentage of total inflow from recharge similarly ranged from 96.9 to 1.8 percent. Higher percentages of total inflow from groundwater inflow correspond to lower percentages from recharge. The percentage of outflow into groundwater was 100 percent from ponds that do not have surface-water inflows or outflows, with the exception of one pond in the Sagamore aquifer, where 93.7 percent of outflow is withdrawn from a well for water supply (table 3).

Limitations of Analysis

The hydrologic budgets listed in table 1 (in back of report) were calculated from numerical models calibrated to measured groundwater levels and streamflows; no direct measurements of pond fluxes were available for comparison to modeled fluxes. Sources of uncertainty inherent in numerical models include (1) inaccuracies in model design, including representation of the hydrogeologic framework, (2) calibration errors resulting from differences between observed and simulated hydrologic conditions, and (3) solution errors. The first two sources of uncertainty are a function of the design of the numerical models and the accuracy of the calibration data; both of these components of uncertainty are discussed in Walter and Whealan (2004), Masterson (2004), and Masterson (2009). Solution errors represent the accuracy of the balance between inflows and outflows and can be estimated for any region of a model domain representing a pond. The solution error of an estimated hydrologic budget is the percent difference between total estimated inflows and outflows relative to the total water flux through the pond. Errors in estimated hydrologic budgets were less than or equal to 0.1 percent in the Sagamore aquifer and less than 0.8 percent

Table 3. Total flows and maximum and minimum percentages of each hydrologic-budget component for ponds with and without surface-water inflows or outflows.

[Max is maximum, Min is minimum]

Modeled aquifer system	Total flow, (cubic feet per day total flow)		Groundwater inflow (percent of total flow)		Groundwater outflow (percent of total flow)		Surface-water inflow (percent of total flow)		Surface-water outflow (percent of total flow)		Pumping from wells (percent of total flow)		Recharge inflow (percent of total flow)		Model error, in percent
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Ponds with surface water inflows or outflows															
Lower Cape Aquifer	57854	16067	92.0	90.4	51.3	20.6	0	0	79.4	48.7	0	0	9.6	8.0	0.00
Monomoy Aquifer	517805	110116	91.6	9.6	85.6	0.3	88.9	58.4	99.7	14.4	0	0	31.7	1.5	0.73
Plymouth-Carver Aquifer	3315660	5869	98.3	12.9	95.5	0	85.9	0	100	4.5	34.7	0	34.1	0.8	5.20
Sagamore Aquifer	870030	42932	93.5	85.6	87.2	3.2	0	0	100	12.8	0	0	14.4	1.3	0.01
Ponds without surface water inflows or outflows															
Lower Cape Aquifer	68488	1837	92.5	3.1	100	100					0	0	96.9	7.5	1.38
Monomoy Aquifer	213130	1196	96.0	22.2	100	100					0	0	77.8	4.0	0.33
Plymouth-Carver Aquifer	619120	2268	98.1	35.4	100	100					0	0	64.6	1.9	8.63
Sagamore Aquifer	434660	5105	98.2	34.6	100	6.3					93.7	0	65.4	1.8	0.10

in the Monomoy aquifer (table 1, in back of report). Errors in estimated hydrologic budgets exceeded 1.0 percent in three ponds in the Lower Cape aquifer and seven ponds in the Plymouth-Carver aquifer; the largest errors in hydrologic budgets for ponds in these two aquifers were about 1.3 and 8.6 percent, respectively (table 1, in back of report). It should be noted that the larger errors generally were calculated for ponds with hydrologic budgets that had relatively small fluxes; differences between total inflow and outflow result in larger budget errors when expressed as percentage of a smaller total water flux.

Summary and Conclusions

The Massachusetts Department of Environmental Protection currently (2011) is developing Total Maximum Daily Loads of phosphorus for kettle-hole ponds in southeastern Massachusetts to assist in protecting aquatic ecosystems. The ponds are in good hydraulic connection to an extensive regional aquifer system that extends from the Plymouth-Carver aquifer on the mainland to aquifers underlying Cape Cod. The ponds receive water from and contribute water to the underlying aquifer. Ponds also receive water from precipitation; the net recharge onto the pond surface is the difference between precipitation and evaporation. Some ponds are connected to surface-water drainages and may receive water from or contribute water to surface waters. In addition, water is withdrawn from two ponds for public supply.

An understanding of the amounts and sources of water fluxes through the ponds—that is, the hydrologic budgets of the ponds—is integral in determining the amount of phosphorus a pond can assimilate without adversely affecting water quality and the ecological health of the pond. The U.S. Geological Survey estimated steady-state hydrologic budgets for 425 ponds in an area of southeastern Massachusetts that encompasses the Plymouth-Carver and Cape Cod aquifer systems. Regional models of these coastal aquifers developed between 2004 and 2008 were used to estimate the hydrologic budgets of the ponds, including the exchange of water with the underlying aquifer, recharge onto the pond surface, flow of water to and from streams, and water withdrawn for water supply. Water fluxes through the ponds are a function of several factors, including the surface area, volume, and bathymetry of the pond as well as the shape and orientation of the pond relative to the regional hydraulic gradient. Other important factors include the hydrologic setting of the pond relative to groundwater divides and discharge boundaries and the hydraulic conductivity of pond-bottom sediments.

The ponds represented in the regional models ranged in surface area from 3.7 to 841.1 acres. Total water fluxes through the region's ponds varied from 1,196 to 3,315,660 cubic feet per day. Ponds that exchange water with both the aquifer and streams generally had higher fluxes than ponds that exchanged water only with the aquifer. The latter group of ponds received water only from recharge and groundwater as inflow. The percentage of total inflow that entered the pond as groundwater for this group of ponds ranged from about 3 to 98 percent. All of the water exited these ponds as recharge back into the aquifer (groundwater outflow) with the exception of one pond, from which water was being removed for water supply. Ponds that exchange water with both the aquifer and streams had more complex hydrologic budgets. In ponds that had surface-water inflows, 58 to 89 percent of the total inflow was from streams. In ponds that had surface-water outflows, the percentage of the total outflow that exited the pond through streams was as low as 5 percent; in some ponds, discharge into streams accounted for all outflow from the pond. Recharge onto the surfaces of ponds that exchanged water with streams ranged from less than 1 to about 34 percent of the total water flux through the pond. For the two ponds that were also used for water supply, the proportion of outflow withdrawn for supply ranged from about 35 to 94 percent.

References Cited

Harbaugh, A.W., 1990, A computer program for calculating subregional water budgets using results from the U.S. Geological Survey modular three-dimensional finite-difference ground-water model: U.S. Geological Survey Open-File Report 90–392, 24 p.

Harbaugh, A.W., Banta, E.R., Hill, M.C., and McDonald, M.G., 2000, MODFLOW–2000, The U.S Geological Survey modular ground-water model—User guide to modularization concepts and the ground-water flow process: U.S. Geological Survey Open-File Report 00–92, 121 p.

LeBlanc, D.R., Guswa, J.H., Frimpter, M.H., and Londquist, C.J., 1986, Ground-water resources of Cape Cod, Massachusetts: U.S. Geological Survey Hydrologic Atlas 692, 4 pls.

Masterson, J.P., 2004, Simulated interaction between freshwater and saltwater and effects of ground-water pumping and sea-level change, Lower Cape Cod aquifer system, Massachusetts: U.S. Geological Survey Scientific Investigations Report 2004–5014, 78 p.

Masterson, J.P., Carlson, C.S., Massey, A.J., and Walter, D.A., 2009, Hydrogeology and simulation of ground-water flow in the Plymouth Carver-Kingston-Duxbury aquifer system, Southeastern Massachusetts: U.S. Geological Survey Scientific Investigations Report 2009–5067, 73 p.

McDonald, M.G., and Harbaugh, A.W., 1988, A modular three-dimensional finite-difference ground-water-flow model: U.S. Geological Survey Techniques of Water-Resources Investigations, book 6, chap A1, 586 p.

Oldale, R.N., 1992, Cape Cod and the islands—The geologic story: Parnassus Imprints, East Orleans, Mass., 205 p.

Oldale, R.N., and Barlow, R.A., 1986, Geologic map of Cape Cod and the Islands, Massachusetts: U.S. Geological Survey Miscellaneous Investigations Series Map I–1763, scale 1:100,000.

Oldale, R.N., and O'Hara, C.J., 1984, Glaciotectonic origin of the Massachusetts coastal end moraines and a fluctuating late Wisconsinan ice margin: Geological Society of America Bulletin, v. 95, p. 61–74.

Prudic, D.E., 1989, Documentation of a computer program to simulate stream-aquifer relations using a modular, finite-difference, ground-water flow model: U.S. Geological Survey Open-File Report 88–729, 113 p.

Uchupi, Elazar, Giese, G.S., and Aubrey, D.G., 1996, The late Quaternary construction of Cape Cod, Massachusetts—A reconsideration of the W.M. Davis model: Geological Society of America Special Paper 309, 69 p.

Walter, D.A., and Masterson, J.P., 2002, Simulated pond-aquifer interactions under natural and stressed conditions, Snake Pond, western Cape Cod, Massachusetts: U.S. Geological Survey Water-Resources Investigations Report 2002–5181, 85 p.

Walter, D.A., and Whealan, A.T., 2004, Simulated water sources and effects of pumping on surface and ground water, Sagamore and Monomoy flow lenses, Cape Cod, Massachusetts: U.S. Geological Survey Scientific Investigations Report 2004–5181, 85 p.

Winter, T.C., Harvey, J.W., Franke, O.L., and Alley, W.M., 1998, Ground water and surface water—A single resource: U.S. Geological Survey Circular 1139, 769 p.

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Table 1

Table 1. Identifiers, names, hydrologic budgets, and model errors for ponds in the Plymouth-Carver and Cape Cod aquifer systems.

[Pond identifiers are unique within each aquifer system; MMR is abbreviation for Massachusetts Military Reservation]

Identifier	Pond name	Inflow				Outflow				
		Recharge (cubic feet per day)	Surface-water inflow (cubic feet per day)	Ground-water inflow (cubic feet per day)	Total inflow (cubic feet per day)	Pumping from wells (cubic feet per day)	Surface-water outflow (cubic feet per day)	Ground-water outflow (cubic feet per day)	Total outflow (cubic feet per day)	Model error (percent)
		Plymouth-Carver Aquifer								
3	Keene Pond	2198	12570	18862	33630	0	23830	9800	33630	0.00
4	Unnamed pond north of Green Harbor Brook	4397	0	49557	53954	0	42659	11319	53978	0.04
5	Unnamed pond north of Bourne Wharf River	8061	0	29641	37702	0	3891	33812	37703	0.00
6	Unnamed pond west of Wright Reservoir	1466	0	10987	12453	0	0	12459	12459	0.05
7	Wright Reservoir	8061	60668	86750	155479	0	7072	148920	155992	0.33
9	South River Reservoir	8794	0	77113	85907	0	80723	5181	85904	0.00
10	Unnamed pond, West Duxbury	2931	0	34004	36935	0	34430	2505	36935	0.00
12	North Hill Marsh	9526	22463	59377	91366	0	15751	75678	91429	0.07
13	Unnamed pond, West Duxbury	1466	0	4404	5870	0	5343	526	5869	-0.01
15	Lorings Bogs	7580	0	56321	63901	0	0	63903	63903	0.00
16	Upper Chandler Pond	1466	0	4797	6263	0	757	5506	6263	-0.01
17	Unnamed pond near Town Forest	2329	0	7914	10243	0	0	10243	10243	0.00
18	Round Pond	1466	0	8582	10048	0	0	10049	10049	0.01
19	Lower Chandler Pond	10385	4351	47808	62544	0	21426	41117	62543	0.00
20	Pine Lake	4397	0	10621	15018	0	0	15018	15018	0.00
21	Island Creek Pond	10992	0	41435	52427	0	0	52424	52424	-0.01
22	Silver Lake	127690	180930	446160	754780	261700	492610	25	754335	-0.06
23	Near Halls Brook	2931	0	9884	12815	0	1096	11720	12816	0.00
24	Mill Pond	1466	13211	34469	49146	0	0	49146	49146	0.00
26	Reeds Millpond	3664	29056	35573	68293	0	22473	45820	68293	0.00
28	Bracketts Pond	1466	15915	19930	37311	0	0	37310	37310	0.00
29	Unnamed pond near Winthrop Street	1466	0	7697	9163	0	0	9163	9163	0.00
32	Blackwater Pond	1466	0	10528	11994	0	10022	1972	11994	0.00
33	Unnamed pond near Jones River Brook	2931	0	40356	43287	0	25217	18070	43287	0.00
35	Crossman Pond	2198	0	13416	15614	0	0	15614	15614	0.00
36	Foundry Pond	2198	0	81243	83441	0	25650	57794	83444	0.00
37	Soules Pond	1649	17420	85163	104232	0	0	104230	104230	0.00

Table 1. Identifiers, names, hydrologic budgets, and model errors for ponds in the Plymouth-Carver and Cape Cod aquifer systems.—Continued

[Pond identifiers are unique within each aquifer system; MMR is abbreviation for Massachusetts Military Reservation]

Identifier	Pond name	Inflow				Outflow				
		Recharge (cubic feet per day)	Surface-water inflow (cubic feet per day)	Ground-water inflow (cubic feet per day)	Total inflow (cubic feet per day)	Pumping from wells (cubic feet per day)	Surface-water outflow (cubic feet per day)	Ground-water outflow (cubic feet per day)	Total outflow (cubic feet per day)	Model error (percent)
Plymouth-Carver Aquifer—Continued										
39	Russell Pond	2931	4281	33032	40244	0	10475	29963	40438	0.48
40	Unnamed pond near Jones River Brook	1466	0	39766	41232	0	11810	29422	41232	0.00
42	Dennetts Pond	1466	34882	18971	55319	0	0	55318	55318	0.00
43	Smelt Pond	11725	0	155760	167485	0	0	167480	167480	0.00
44	Goose Pond	1649	0	14542	16191	0	0	16191	16191	0.00
45	Pratt Pond	1466	0	13098	14564	0	0	14563	14563	0.00
46	Indian Pond	18320	0	35464	53784	0	29243	27494	56737	5.20
48	Little Smelt Pond	1466	0	30285	31751	0	0	31752	31752	0.00
49	Unnamed pond near Upland Road	2198	0	78407	80605	0	25422	55183	80605	0.00
50	Muddy Pond	10992	0	79365	90357	0	0	90358	90358	0.00
51	Unnamed pond near Brook Street	7328	0	81168	88496	0	0	88496	88496	0.00
52	Triangle Pond	5294	0	93274	98568	0	0	98568	98568	0.00
54	Little Muddy Pond	1466	0	21540	23006	0	0	23007	23007	0.01
55	Little Pond	8794	0	77865	86659	0	0	86660	86660	0.00
56	Ricketts Pond	2931	0	35839	38770	0	0	38772	38772	0.00
57	Unnamed pond near High Street	2198	0	87997	90195	0	41394	48825	90219	0.03
58	Unnamed pond southwest of Ricketts Pond	1466	0	32084	33550	0	0	33549	33549	0.00
59	Billington Sea	55693	0	942610	998303	0	990360	7876	998236	-0.01
61	Lout Pond	4397	0	9667	14064	0	0	14064	14064	0.00
62	Darby Pond	8794	0	14929	23723	0	0	23699	23699	-0.10
63	Little Cedar Pond	1630	0	17148	18778	0	16097	2815	18912	0.71
64	Clear Pond	2363	10582	15664	28609	0	10582	18292	28874	0.92
66	Unnamed pond near Cedar Swamp	1466	0	39874	41340	0	0	41346	41346	0.02
67	Bartlett Pond	9691	878650	311310	1199651	0	1051600	148080	1199680	0.00
68	Unnamed pond near Doten Brook	1466	0	25315	26781	0	0	26785	26785	0.02
69	Briggs Reservoir	4397	0	86244	90641	0	0	90640	90640	0.00
71	Unnamed pond near Cole Mill	1466	0	21761	23227	0	0	23227	23227	0.00

Table 1. Identifiers, names, hydrologic budgets, and model errors for ponds in the Plymouth-Carver and Cape Cod aquifer systems.—Continued

[Pond identifiers are unique within each aquifer system; MMR is abbreviation for Massachusetts Military Reservation]

Identifier	Pond name	Inflow				Outflow				
		Recharge (cubic feet per day)	Surface-water inflow (cubic feet per day)	Ground-water inflow (cubic feet per day)	Total inflow (cubic feet per day)	Pumping from wells (cubic feet per day)	Surface-water outflow (cubic feet per day)	Ground-water outflow (cubic feet per day)	Total outflow (cubic feet per day)	Model error (percent)
		Plymouth-Carver Aquifer—Continued								
72	Unnamed pond near Plymouth Road	2198	0	58944	61142	0	61103	0	61103	-0.06
74	Howland Pond	1466	0	31435	32901	0	19753	13148	32901	0.00
76	Unnamed pond on Eel River	2931	0	122330	125261	0	94249	31022	125271	0.01
77	Cooks Pond	5862	0	87300	93162	0	0	93162	93162	0.00
78	Fresh Meadow Pond	15389	0	184240	199629	0	198010	1794	199804	0.09
79	Unnamed pond near Plymouth Road	1466	0	11504	12970	0	0	12959	12959	-0.08
80	Little, Big, and Grassy West Ponds	22717	0	97217	119934	0	0	119940	119940	0.01
82	Micajah Pond	4397	0	59333	63730	0	0	63570	63570	-0.25
83	Unnamed pond near Plymouth Road	1466	0	9865	11330	0	0	11334	11334	0.03
84	Forge Pond	2198	0	123690	125888	0	85724	40158	125882	-0.01
85	Russell Millpond	13190	1274	420270	434734	0	221160	213540	434700	-0.01
86	Cooper Pond	4397	0	40082	44479	0	0	44488	44488	0.02
87	Great South Pond	87203	0	356250	443453	0	0	443410	443410	-0.01
88	Little Micajah Pond	2931	0	23891	26822	0	0	26974	26974	0.56
89	Wenham Pond	9526	0	65520	75046	0	36816	39847	76663	2.11
90	Unnamed pond southwest of Forge Pond	1466	0	73471	74937	0	0	74936	74936	0.00
92	South Triangle Pond	5130	0	81558	86688	0	0	86723	86723	0.04
93	Spring Pond	1466	0	10668	12134	0	0	12138	12138	0.04
94	Muddy Pond	16109	0	307980	324089	0	324040	5	324045	-0.01
95	Kings Pond	7328	0	74286	81614	0	69160	12413	81573	-0.05
96	Ellis Pond	3828	0	14272	18100	0	0	18125	18125	0.14
97	Fresh Pond	12458	0	50457	62915	0	0	65652	65652	4.17
98	Unnamed pond near Sandwich Road	2198	0	27200	29398	0	0	29380	29380	-0.06
99	Johns Pond	5130	0	5389	10519	0	0	10521	10521	0.02
100	Unnamed pond near Stone Street	4397	0	18836	23233	0	0	23233	23233	0.00
101	Unnamed pond near Centre Street	1466	0	35798	37264	0	0	37269	37269	0.01
103	Unnamed pond near Valley Road	1466	0	29451	30917	0	0	30930	30930	0.04

Table 1. Identifiers, names, hydrologic budgets, and model errors for ponds in the Plymouth-Carver and Cape Cod aquifer systems.—Continued

[Pond identifiers are unique within each aquifer system; MMR is abbreviation for Massachusetts Military Reservation]

Identifier	Pond name	Inflow				Outflow				
		Recharge (cubic feet per day)	Surface-water inflow (cubic feet per day)	Ground-water inflow (cubic feet per day)	Total inflow (cubic feet per day)	Pumping from wells (cubic feet per day)	Surface-water outflow (cubic feet per day)	Ground-water outflow (cubic feet per day)	Total outflow (cubic feet per day)	Model error (percent)
Plymouth-Carver Aquifer—Continued										
104	Unnamed pond near Pond Street	1466	0	36393	37859	0	0	37860	37860	0.00
105	Beaver Dam Pond	6595	0	160880	167475	0	138070	29431	167501	0.02
106	Island Pond	2931	0	19943	22874	0	0	22874	22874	0.00
107	Powderhorn Pond	2931	0	29366	32297	0	0	32297	32297	0.00
108	Unnamed pond near Forest Street	5130	0	9830	14960	0	0	14962	14962	0.02
110	Unnamed pond near airport	1466	0	15946	17412	0	0	17411	17411	0.00
111	Long Island Pond	8061	100690	70161	178912	0	74212	109790	184002	2.77
112	Hoyts Pond	10259	0	34302	44561	0	0	44560	44560	0.00
113	Unnamed pond near Centre Street	1466	2084	22554	26104	0	0	25914	25914	-0.73
114	Clear Bottom Pond	1466	0	14535	16001	0	0	16003	16003	0.01
115	Little Widgeon Pond	2198	0	9690	11889	0	0	11889	11889	0.00
116	South Meadow Pond	4397	0	35722	40119	0	15384	24739	40123	0.01
117	Negro Pond	733	0	1668	2401	0	0	2401	2401	0.00
118	Unnamed pond near Rocky Neck Road	1466	0	32002	33468	0	24317	9155	33472	0.01
119	Widgeon pond	5862	0	13698	19560	0	0	19560	19560	0.00
120	Shallow Pond	3664	14096	10809	28569	0	0	28339	28339	-0.81
121	Curlew Pond	8794	0	27802	36596	0	0	36595	36595	0.00
122	Vaughn Pond	4397	0	25182	29579	0	0	29580	29580	0.00
123	Island Pond	18320	20732	162150	201202	0	78492	122070	200562	-0.32
124	Unnamed pond near Federal Furnace Road	1466	7817	18120	27403	0	16183	11223	27406	0.01
125	Unnamed pond near Meadow Street	2198	0	12297	14495	0	0	14496	14496	0.00
126	Crooked Pond	1466	0	7148	8613	0	0	8613	8613	0.00
127	Rocky Pond	3664	0	25138	28802	0	0	28802	28802	0.00
128	Unnamed pond near Tremont St	1466	941	16314	18720	0	0	18722	18722	0.01
129	Unnamed pond near Purchase Street	1093	0	30607	31700	0	0	31700	31700	0.00
130	Federal Pond	32976	0	322820	355796	0	272950	83127	356077	0.08
131	Unnamed pond in Cedar Swamp	2198	8388	21560	32146	0	1948	30213	32161	0.05

Table 1. Identifiers, names, hydrologic budgets, and model errors for ponds in the Plymouth-Carver and Cape Cod aquifer systems.—Continued

[Pond identifiers are unique within each aquifer system; MMR is abbreviation for Massachusetts Military Reservation]

Identifier	Pond name	Inflow				Outflow				
		Recharge (cubic feet per day)	Surface-water inflow (cubic feet per day)	Ground-water inflow (cubic feet per day)	Total inflow (cubic feet per day)	Pumping from wells (cubic feet per day)	Surface-water outflow (cubic feet per day)	Ground-water outflow (cubic feet per day)	Total outflow (cubic feet per day)	Model error (percent)
Plymouth-Carver Aquifer—Continued										
132	Clam Pudding Pond	2931	0	15043	17974	0	0	17969	17969	-0.03
133	Briggs Reservoir	9526	0	78799	88325	0	0	88329	88329	0.00
134	Unnamed pond in Cedar Swamp	2198	1270	17825	21293	0	14432	6864	21296	0.01
135	Unnamed pond near Maxim Corner	2198	0	36825	39023	0	18466	20557	39023	0.00
137	Little Long and Long Ponds	57158	0	561890	619048	0	0	619120	619120	0.01
138	Ship Pond	2198	0	36630	38828	0	0	38830	38830	0.00
139	Unnamed pond near South Meadow Brook	4397	0	66049	70446	0	52319	18331	70650	0.29
140	Morey Hole	5862	0	50942	56804	0	0	56804	56804	0.00
142	College Pond	10992	0	74380	85372	0	0	85373	85373	0.00
144	Dunham Pond	9526	33064	59011	101601	0	33064	68851	101915	0.31
145	Unnamed pond near Rocky Meadow Brook	2198	1964	21275	25437	0	10308	15130	25438	0.00
147	Gallows Pond	10259	0	103980	114239	0	0	114220	114220	-0.02
148	Torrey Pond	3664	0	42773	46437	0	0	46438	46438	0.00
149	Unnamed pond near Atwood Bogs	57158	0	39601	96759	0	0	105900	105900	8.63
150	Three Cornered Pond	6595	0	72733	79328	0	0	79329	79329	0.00
151	Dugway Pond	1466	0	21452	22918	0	0	22918	22918	0.00
153	Halfway Pond	45434	0	1237600	1283034	0	1277700	5354	1283054	0.00
154	Sampson Pond	63021	18358	259050	340429	0	315940	26386	342326	0.55
155	Unnamed pond near Crane Brook	1466	0	15472	16938	0	0	16935	16935	-0.02
156	Bloody Pond	23450	0	344500	367950	0	0	367950	367950	0.00
157	Unnamed pond near Tremont Street	7328	0	54125	61453	0	33969	27327	61296	-0.26
158	Unnamed pond near Double Brook	3664	0	21136	24800	0	0	24803	24803	0.01
160	Round Pond	5862	0	86530	92392	0	0	92383	92383	-0.01
161	New Long Pond	5862	0	124990	130852	0	0	130850	130850	0.00
163	Unnamed pond near Atwood Bogs	2198	0	19224	21422	0	0	21492	21492	0.32
164	Bumps Pond	3664	0	64589	68253	0	0	68254	68254	0.00
166	Savery Pond	6595	0	125670	132265	0	85604	46689	132293	0.02

Table 1. Identifiers, names, hydrologic budgets, and model errors for ponds in the Plymouth-Carver and Cape Cod aquifer systems.—Continued

[Pond identifiers are unique within each aquifer system; MMR is abbreviation for Massachusetts Military Reservation]

Identifier	Pond name	Inflow				Outflow				
		Recharge (cubic feet per day)	Surface-water inflow (cubic feet per day)	Ground-water inflow (cubic feet per day)	Total inflow (cubic feet per day)	Pumping from wells (cubic feet per day)	Surface-water outflow (cubic feet per day)	Ground-water outflow (cubic feet per day)	Total outflow (cubic feet per day)	Model error (percent)
Plymouth-Carver Aquifer—Continued										
167	East Head Pond	25648	0	499870	525518	0	156870	368090	524960	-0.11
168	Unnamed pond near Tremont Street	3664	0	37766	41430	0	18762	22668	41430	0.00
169	Barrett Pond	2931	0	45599	48530	0	0	48531	48531	0.00
171	Bates Pond	5862	0	19223	25085	0	0	25085	25085	0.00
172	Cedar Pond	1733	0	23389	25122	0	0	25123	25123	0.00
173	Unnamed Reservoir	2931	17513	96476	116920	0	68665	48254	116919	0.00
175	Little Herring Pond	20518	0	718610	739128	0	678840	60551	739391	0.04
176	Fearing Pond	5130	0	109010	114140	0	0	114140	114140	0.00
177	Unnamed pond near Huckleberry Corner	1466	0	14609	16075	0	0	16076	16076	0.01
178	Clear Pond	1466	0	12449	13915	0	0	13916	13916	0.01
179	Black Jummy Pond	2198	0	48656	50854	0	0	50856	50856	0.00
180	Hedges Pond	6595	0	120820	127415	0	0	127420	127420	0.00
181	Fawn Pond	10992	0	257850	268842	0	41538	227360	268898	0.02
182	New Grassy Pond	1466	0	53193	54659	0	0	54657	54657	0.00
183	Unnamed pond near Crane Brook	1093	0	7166	8258	0	6467	1788	8255	-0.04
184	Wall Pond	2198	0	41002	43200	0	0	43200	43200	0.00
185	Lang Duck Pond	7328	0	111060	118388	0	0	118370	118370	-0.02
187	Big Rocky Pond	3664	0	40847	44511	0	0	44523	44523	0.03
188	Triangle Pond	3664	0	61638	65302	0	0	65290	65290	-0.02
189	Deer Pond	1466	0	30071	31537	0	0	31541	31541	0.01
190	Golden Field Pond	3664	0	52489	56153	0	0	56153	56153	0.00
191	White Island Pond	68150	0	404100	472250	0	130450	342540	472990	0.16
192	Abner Pond	1466	0	50881	52347	0	0	52347	52347	0.00
193	Raccoon Pond	1466	0	42659	44125	0	0	44126	44126	0.00
194	Unnamed pond near Crane Brook	19053	0	71014	90067	0	24539	65531	90070	0.00
196	Unnamed pond near Beach Street	3291	0	18661	21952	0	0	21952	21952	0.00
198	Charge Pond	4397	0	95176	99573	0	0	99575	99575	0.00

Table 1. Identifiers, names, hydrologic budgets, and model errors for ponds in the Plymouth-Carver and Cape Cod aquifer systems.—Continued

[Pond identifiers are unique within each aquifer system; MMR is abbreviation for Massachusetts Military Reservation]

Identifier	Pond name	Inflow				Outflow				
		Recharge (cubic feet per day)	Surface-water inflow (cubic feet per day)	Ground-water inflow (cubic feet per day)	Total inflow (cubic feet per day)	Pumping from wells (cubic feet per day)	Surface-water outflow (cubic feet per day)	Ground-water outflow (cubic feet per day)	Total outflow (cubic feet per day)	Model error (percent)
Plymouth-Carver Aquifer—Continued										
199	Big Sandy Pond	27846	0	101170	129016	0	0	128710	128710	-0.24
200	Island Pond	12458	0	162180	174638	0	0	174600	174600	-0.02
201	Unnamed pond near Agawam River	8061	100380	352050	460491	0	394000	66222	460222	-0.06
202	Unnamed pond near Wareham Street	7328	0	24445	31773	0	0	31773	31773	0.00
203	Great Herring Pond	90134	0	681230	771364	0	81364	691580	772944	0.20
204	Unnamed pond near Frogfoot Brook	5862	66377	86947	159186	0	13583	145630	159213	0.02
205	Fivemile Pond	3664	0	109710	113374	0	0	113340	113340	-0.03
206	Unnamed pond near Wareham Street	2931	0	25596	28527	0	0	28527	28527	0.00
209	Merton Pond	2198	0	31550	33748	0	0	33745	33745	-0.01
210	Whites Pond	7328	0	59257	66585	0	0	66830	66830	0.37
211	Elbow Pond	5862	0	64145	70007	0	0	70226	70226	0.31
213	Ezekiel Pond	8061	0	55838	63899	0	0	63893	63893	-0.01
214	Unnamed pond near Wareham Street	5862	0	54465	60327	0	0	60326	60326	0.00
215	Little Long Pond	3664	0	163180	166844	0	0	166850	166850	0.00
217	Grassy Pond	1627	0	22938	24565	0	0	24603	24603	0.15
218	Unnamed pond near Hammond Street	2931	0	29049	31980	0	0	31975	31975	-0.02
220	Glen Charlie Pond	40304	2847000	427800	3315104	0	2639800	675860	3315660	0.02
223	Unnamed pond southeast of Little Long Pond	5130	0	296170	301300	0	138690	162600	301290	0.00
224	Unnamed pond near Hammond Street	6955	0	84587	91542	0	0	91541	91541	0.00
225	Tihonet Pond	23450	2390	259670	285510	0	35324	250140	285464	-0.02
226	Little Rocky Pond	2198	0	32363	34561	0	0	34584	34584	0.07
227	Little Sandy Pond	6595	0	70318	76913	0	0	76880	76880	-0.04
229	Unnamed pond near Charge Pond Road	1466	11859	34945	48270	0	0	44450	44450	-8.59
230	Unnamed pond near Main Street	11725	143870	78108	233703	0	66529	167180	233709	0.00
232	Bartlett Pond	2198	0	52425	54623	0	0	54615	54615	-0.02
233	Unnamed pond near Charge Pond Road	1466	0	39337	40803	0	0	40807	40807	0.01
234	Unnamed pond near Charge Pond Road	1466	0	52424	53890	0	7670	47371	55041	2.09

Table 1. Identifiers, names, hydrologic budgets, and model errors for ponds in the Plymouth-Carver and Cape Cod aquifer systems.—Continued

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Identifier	Pond name	Inflow				Outflow				
		Recharge (cubic feet per day)	Surface-water inflow (cubic feet per day)	Ground-water inflow (cubic feet per day)	Total inflow (cubic feet per day)	Pumping from wells (cubic feet per day)	Surface-water outflow (cubic feet per day)	Ground-water outflow (cubic feet per day)	Total outflow (cubic feet per day)	Model error (percent)
Plymouth-Carver Aquifer—Continued										
235	Unnamed pond near Charge Pond Road	1466	0	58309	59775	0	24040	35721	59761	-0.02
236	Mosquito Pond	2198	0	33609	35807	0	0	35806	35806	0.00
237	Unnamed pond near Charge Pond Road	1466	0	61749	63215	0	0	63227	63227	0.02
239	Unnamed pond west of Glen Charlie Pond	1466	0	74830	76296	0	0	76297	76297	0.00
240	Black Pond	1629	0	26042	27671	0	0	27456	27456	-0.78
241	Unnamed pond near Rose Brook	2931	2684	47269	52884	0	12671	40205	52876	-0.01
242	Unnamed pond near Maple Swamp	3664	0	157270	160934	0	107250	53702	160952	0.01
243	Unnamed pond near Maple Swamp	2931	867	80992	84790	0	70302	14472	84774	-0.02
244	Weeks Pond	2198	0	84665	86863	0	0	86865	86865	0.00
245	Mill and Spectacle Ponds	50677	178470	510984	740131	0	291706	449048	740754	0.08
246	Unnamed pond near Harlow Brook	847	0	18147	18994	0	0	18975	18975	-0.10
249	Unnamed pond near Harlow Brook	733	0	18781	19514	0	0	19500	19500	-0.07
251	Parker Mills Pond	16122	0	181990	198112	0	138020	60043	198063	-0.02
252	Foundry Pond	1466	0	45974	47440	0	0	47361	47361	-0.17
253	Goat Pasture Pond	4397	0	108690	113087	0	0	113100	113100	0.01
254	Mare Pond	5201	0	179700	184901	0	0	184910	184910	0.00
255	Unnamed pond south of Weeks Pond	2931	0	113420	116351	0	0	116370	116370	0.02
256	Sandy Pond	5862	1835	45018	52716	0	5079	47289	52368	-0.66
259	Horseshoe Pond	13190	0	157690	170880	0	155150	15728	170878	0.00
260	Cedar Pond	2931	112	84667	87710	0	31358	56081	87439	-0.31
262	Union Pond	3664	11884	63352	78900	0	19528	59367	78895	-0.01
263	Dicks Pond	9526	0	140500	150026	0	49350	100980	150330	0.20
264	Sand Pond	2198	0	7708	9907	0	0	9906	9906	0.00
265	Queen Sewell Pond	2931	0	31369	34300	0	0	34286	34286	-0.04
266	Blackmere Reservoir	2198	0	19082	21280	0	0	21281	21281	0.00
267	Nightingale Pond	1537	0	19549	21086	0	0	21082	21082	-0.02
268	Beaverdam Pond	1466	0	8492	9958	0	0	9957	9957	-0.01

Table 1. Identifiers, names, hydrologic budgets, and model errors for ponds in the Plymouth-Carver and Cape Cod aquifer systems.—Continued

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Identifier	Pond name	Inflow				Outflow				
		Recharge (cubic feet per day)	Surface-water inflow (cubic feet per day)	Ground-water inflow (cubic feet per day)	Total inflow (cubic feet per day)	Pumping from wells (cubic feet per day)	Surface-water outflow (cubic feet per day)	Ground-water outflow (cubic feet per day)	Total outflow (cubic feet per day)	Model error (percent)
Plymouth-Carver Aquifer—Continued										
270	Unnamed pond near Brandy Hill	1466	0	803	2268	0	0	2268	2268	0.00
271	Bourne Pond	2198	0	20442	22640	0	0	22639	22639	-0.01
Sagamore Aquifer										
3	Lower Shawme Lake	5288	0	283670	288958	0	255950	33008	288958	0.00
4	Upper Shawme Lake	4499	0	342020	346519	0	284110	62413	346523	0.00
5	Hoxie Pond	2986	0	99963	102949	0	99689	3255	102944	0.00
6	Nye Pond	1990	0	56924	58914	0	40525	18386	58911	0.01
7	Mill Pond	1168	0	51079	52247	0	0	52247	52247	0.00
8	Clay Pond	1168	0	13601	14769	0	0	14769	14769	0.00
10	unnamed pond, West Barnstable	3915	0	131650	135565	0	43195	92370	135565	0.00
11	Hinckley Pond	1752	0	38396	40148	0	0	40148	40148	0.00
12	Spectacle Pond	14016	0	55845	69861	0	0	69849	69849	0.02
13	Lawrence Pond	19856	0	100190	120046	0	0	120020	120020	0.02
14	Dennis Pond	2336	0	22874	25210	0	0	25210	25210	0.00
15	Miss Thachers Pond	1168	0	41764	42932	0	32187	10745	42932	0.00
16	Greenough Pond	4088	0	25044	29132	0	0	29132	29132	0.00
17	Elishas Pond	1752	0	17926	19678	0	0	19678	19678	0.00
18	Triangle Pond	11096	0	32388	43484	0	0	43485	43485	0.00
19	Garretts Pond	4784	0	68296	73080	0	0	73079	73079	0.00
20	Peters Pond	18688	0	147700	166388	0	0	166370	166370	0.01
21	Flax Pond	3504	0	125300	128804	0	0	128800	128800	0.00
22	Little Pond	1752	0	21414	23166	0	0	23167	23167	0.00
23	Hathaway Pond (north)	2920	0	13789	16709	0	0	16710	16710	-0.01
24	SnakePond	12264	0	56722	68986	0	0	68999	68999	-0.02
25	Flax Pond	1752	0	20278	22030	0	0	22030	22030	0.00
26	Israel Pond	2920	0	19033	21953	0	0	21951	21951	0.01
27	Mystic/Middle/Hamblin Pond	59792	0	375300	435092	0	0	434660	434660	0.10

Table 1. Identifiers, names, hydrologic budgets, and model errors for ponds in the Plymouth-Carver and Cape Cod aquifer systems.—Continued

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Identifier	Pond name	Inflow				Outflow				
		Recharge (cubic feet per day)	Surface-water inflow (cubic feet per day)	Ground-water inflow (cubic feet per day)	Total inflow (cubic feet per day)	Pumping from wells (cubic feet per day)	Surface-water outflow (cubic feet per day)	Ground-water outflow (cubic feet per day)	Total outflow (cubic feet per day)	Model error (percent)
		Sagamore Aquifer—Continued								
28	Lamson Pond	2920	0	20302	23222	0	0	23220	23220	0.01
29	Hathaway Pond (south)	2336	0	11120	13456	0	0	13455	13455	0.01
30	Wequaquet Lake	100670	0	182650	283320	0	0	283360	283360	-0.01
31	Pimlico Pond	1752	0	66519	68271	0	0	68269	68269	0.00
32	Weeks Pond	2336	0	14218	16554	0	0	16555	16555	-0.01
33	Shallow Pond	12848	0	6797	19645	0	0	19645	19645	0.00
34	Mashpee/Wakeby Pond	125060	0	744990	870050	0	269340	600690	870030	0.00
35	Mary Dunn Pond	2920	0	16132	19052	0	0	19052	19052	0.00
36	Red Brook Pond	2450	0	130570	133020	0	0	133020	133020	0.00
38	Phlashes Pond	7008	0	51181	58189	0	0	58191	58191	0.00
39	Long Pond	9911	0	67496	77407	0	0	77406	77406	0.00
40	Schubael Pond	10040	0	57514	67554	0	0	67519	67519	0.05
41	Bassetts Lot Pond	1168	0	11567	12735	0	0	12735	12735	0.00
42	Long Pond	7592	0	96476	104068	0	0	104070	104070	0.00
43	Horse Pond	4277	0	30501	34778	0	0	34778	34778	0.00
44	Muddy Pond	3504	0	38359	41863	0	0	41864	41864	0.00
45	Little Sandy Pond	1752	0	21887	23639	0	0	23639	23639	0.00
46	Big Sandy Pond	1752	0	14998	16750	0	0	16750	16750	0.00
47	Jabinettes Pond	1168	0	15698	16866	0	0	16866	16866	0.00
49	Santuit Pond	25523	0	369160	394683	0	147270	247450	394720	-0.01
50	Long Pond	3504	0	85779	89283	0	0	89283	89283	0.00
51	Osborn Pond	3158	0	38994	42152	0	0	42164	42164	-0.03
52	Fawcetts Pond	1168	0	41595	42763	0	0	42763	42763	0.00
53	North Pond	1168	0	33414	34582	0	0	34581	34581	0.00
54	Lovells Pond	8176	0	126560	134736	0	0	134710	134710	0.02
55	West Pond	1752	0	48357	50109	0	0	50111	50111	0.00
56	Cedar Lake	3981	0	134060	138041	0	97743	40297	138040	0.00

Table 1. Identifiers, names, hydrologic budgets, and model errors for ponds in the Plymouth-Carver and Cape Cod aquifer systems.—Continued

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Identifier	Pond name	Inflow				Outflow				
		Recharge (cubic feet per day)	Surface-water inflow (cubic feet per day)	Ground-water inflow (cubic feet per day)	Total inflow (cubic feet per day)	Pumping from wells (cubic feet per day)	Surface-water outflow (cubic feet per day)	Ground-water outflow (cubic feet per day)	Total outflow (cubic feet per day)	Model error (percent)
		Sagamore Aquifer—Continued								
57	Washburn Pond	1752	0	51441	53193	0	0	53193	53193	0.00
58	Simmons Pond	1864	0	18302	20166	0	0	20166	20166	0.00
59	Moody Pond	4088	0	168230	172318	0	0	172320	172320	0.00
60	Micah Pond	2336	0	40795	43131	0	0	43131	43131	0.00
61	Bog Pond	1168	0	30252	31420	0	0	31427	31427	-0.02
62	Joshua Pond	1752	0	30055	31807	0	0	31805	31805	0.01
63	Ashumet Pond	32704	0	335650	368354	0	0	368310	368310	0.01
64	Eagle Pond	1168	0	28654	29822	0	0	29821	29821	0.00
65	Johns Pond	52146	0	665840	717986	0	292360	425630	717990	0.00
67	Wings Pond	4088	0	321720	325808	0	325810	0	325810	0.00
68	Deep Pond	5614	0	93487	99101	0	0	99101	99101	0.00
69	Coonamessett Pond	27568	0	477990	505558	0	64640	440920	505560	0.00
70	Grassy Pond	1168	0	27318	28486	0	0	28487	28487	0.00
71	Unnamed pond near Johns Pond	1752	0	55121	56873	0	0	56873	56873	0.00
72	Martha Pond	1752	0	43190	44942	0	0	44942	44942	0.00
73	Round Pond	1752	0	18764	20516	0	0	20516	20516	0.00
74	Crooked Pond	5840	0	129990	135830	0	0	135830	135830	0.00
75	Unnamed pond near Johns Pond	1168	0	29794	30962	0	0	30962	30962	0.00
76	Crocker Pond	1168	0	34349	35517	0	0	35517	35517	0.00
77	Shallow Pond	2283	0	56664	58947	0	0	58947	58947	0.00
78	Round Pond	4155	0	108580	112735	0	0	112740	112740	0.00
79	Jenkins Pond	14136	0	240130	254266	0	0	254250	254250	0.01
80	Fresh Pond	1752	0	34943	36695	0	0	36695	36695	0.00
81	Unnamed pond along Coonamessett River	3158	0	153500	156658	0	119830	36825	156655	0.00
82	Deer Pond	2163	0	9816	11979	0	0	11980	11980	-0.01
84	Flax Pond	2920	0	74057	76977	0	0	76977	76977	0.00
85	Mares Pond	4672	0	64221	68893	0	0	68896	68896	0.00

Table 1. Identifiers, names, hydrologic budgets, and model errors for ponds in the Plymouth-Carver and Cape Cod aquifer systems.—Continued

[Pond identifiers are unique within each aquifer system; MMR is abbreviation for Massachusetts Military Reservation]

Identifier	Pond name	Inflow				Outflow				
		Recharge (cubic feet per day)	Surface-water inflow (cubic feet per day)	Ground-water inflow (cubic feet per day)	Total inflow (cubic feet per day)	Pumping from wells (cubic feet per day)	Surface-water outflow (cubic feet per day)	Ground-water outflow (cubic feet per day)	Total outflow (cubic feet per day)	Model error (percent)
		Sagamore Aquifer—Continued								
86	Spectacle Pond	2920	0	54749	57669	0	0	57669	57669	0.00
87	Bourne Pond	1168	0	7298	8466	0	0	8466	8466	0.00
88	Long Pond	22776	0	329200	351976	329900	0	22057	351957	0.01
89	Dean Pond	1752	0	10440	12192	0	0	12192	12192	0.00
90	Grews Pond	2336	0	5272	7608	0	0	7608	7608	0.00
91	Jones Pond	1872	0	15349	17221	0	0	17221	17221	0.00
92	Morse Pond	1752	0	10983	12735	0	0	12735	12735	0.00
93	Shivericks Pond	1168	0	6114	7282	0	0	7283	7283	0.00
94	Siders Pond	5256	0	54534	59790	0	0	59771	59771	0.03
95	Pond near MMR rotary	1990	0	44375	46365	0	0	46366	46366	0.00
96	Edmunds Pond	2986	0	32322	35308	0	0	35307	35307	0.00
98	unnamed pond north of Shivericks Pond	1990	0	3115	5105	0	0	5105	5105	0.00
99	Jim Pond	4066	0	2953	7018	0	0	7018	7018	0.00
100	Unnamed pond near Quaker Meetinghouse Rd and Route 6A	1990	0	34211	36201	0	0	36202	36202	0.00
101	Hog Pond (North)	1990	0	9322	11312	0	0	11312	11312	0.00
102	Hog Pond (South)	1990	0	8613	10604	0	0	10603	10603	0.01
103	Pattys Pond	1990	0	27845	29835	0	0	29835	29835	0.00
104	Round Pond	1990	0	12990	14980	0	0	14981	14981	0.00
105	Lambert Pond	4093	0	34647	38740	0	0	38744	38744	-0.01
107	Miller Pond	1990	0	7197	9187	0	0	9187	9187	0.00
108	Flintrock Pond	1990	0	12559	14549	0	0	14550	14550	0.00
109	Spruce Pond	995	0	6213	7208	0	0	7208	7208	0.00
110	Sandy Hill Pond	1990	0	9795	11786	0	0	11786	11786	0.00
		Monomoy Aquifer								
2	Cedar Pond	3981	0	17735	21716	0	0	21715	21715	0.00
3	Harvey Pond	2083	0	2897	4980	0	0	4978	4978	-0.02

Table 1. Identifiers, names, hydrologic budgets, and model errors for ponds in the Plymouth-Carver and Cape Cod aquifer systems.—Continued

[Pond identifiers are unique within each aquifer system; MMR is abbreviation for Massachusetts Military Reservation]

Identifier	Pond name	Inflow				Outflow				
		Recharge (cubic feet per day)	Surface-water inflow (cubic feet per day)	Ground-water inflow (cubic feet per day)	Total inflow (cubic feet per day)	Pumping from wells (cubic feet per day)	Surface-water outflow (cubic feet per day)	Ground-water outflow (cubic feet per day)	Total outflow (cubic feet per day)	Model error (percent)
		Monomoy Aquifer—Continued								
4	Crystal Lake	6251	0	37982	44233	0	0	44343	44343	0.25
5	Baker Pond	4672	0	46537	51209	0	0	51340	51340	0.26
6	Flax Pond	7592	0	88734	96326	0	0	96310	96310	-0.02
7	Pilgrim Lake	6835	0	68490	75325	0	0	75434	75434	0.14
8	Blueberry/Salls Pond	4499	0	50868	55367	0	0	55365	55365	0.00
9	Cobbs Pond	2920	0	70591	73511	0	0	73513	73513	0.00
10	Cliff/Little Cliff Pond	37376	0	175580	212956	0	0	213130	213130	0.08
11	Higgins Pond	4088	0	49176	53264	0	0	53149	53149	-0.22
12	Coles Pond	3981	0	7130	11110	0	0	11114	11114	0.03
13	School House Pond	1884	0	23757	25641	0	0	25641	25641	0.00
14	Ruth Pond	2163	0	15245	17408	0	0	17409	17409	0.00
15	Smith Pond	2163	0	18572	20735	0	0	20737	20737	0.01
16	Rafe Pond	1752	0	9501	11253	0	0	11252	11252	-0.01
17	Sheep Pond	22776	0	25333	48109	0	0	48088	48088	-0.04
18	Sarahs Pond	1990	0	14992	16982	0	0	16996	16996	0.08
19	Twinings Pond	1752	0	27571	29323	0	0	29326	29326	0.01
20	Griffiths Pond	4672	0	32310	36982	0	0	36982	36982	0.00
21	Lower Mill Pond	7419	433140	46875	487434	0	448190	42851	491041	0.73
22	Scargo Lake	8003	0	44930	52933	0	0	52978	52978	0.08
23	Shoal/Deep Pond	4246	0	44033	48279	0	0	48276	48276	-0.01
24	Uncle Seths Pond	1990	0	14423	16413	0	0	16434	16434	0.13
25	Canoe Pond	2163	0	1021	3184	0	0	3176	3176	-0.24
26	Upper Mill Pond	39605	0	429326	468931	0	467520	1256	468776	-0.03
27	Long Pond	138830	0	299370	438200	0	165520	272190	437710	-0.11
28	Cedar Pond	1752	0	2787	4539	0	0	4544	4544	0.10
29	Seymour Pond	21608	0	179040	200648	0	154370	46233	200603	-0.02
30	Aunt Pattys Pond	2517	0	2825	5341	0	0	5344	5344	0.04

Table 1. Identifiers, names, hydrologic budgets, and model errors for ponds in the Plymouth-Carver and Cape Cod aquifer systems.—Continued

[Pond identifiers are unique within each aquifer system; MMR is abbreviation for Massachusetts Military Reservation]

Identifier	Pond name	Inflow				Outflow				
		Recharge (cubic feet per day)	Surface-water inflow (cubic feet per day)	Ground-water inflow (cubic feet per day)	Total inflow (cubic feet per day)	Pumping from wells (cubic feet per day)	Surface-water outflow (cubic feet per day)	Ground-water outflow (cubic feet per day)	Total outflow (cubic feet per day)	Model error (percent)
		Monomoy Aquifer—Continued								
31	Walkers Pond	18367	0	69655	88022	0	0	88028	88028	0.01
32	Slough Pond	4499	0	17001	21500	0	0	21496	21496	-0.02
33	Simmons Pond	584	0	612	1196	0	0	1196	1196	0.01
34	Pine Pond	2920	0	7572	10492	0	0	10494	10494	0.02
35	Bakers Pond	2336	0	7314	9650	0	0	9651	9651	0.01
36	Hinckleys Pond	23944	302460	191170	517574	0	461330	56475	517805	0.04
37	Hawksnest/Slack Pond	5667	0	5555	11222	0	0	11209	11209	-0.11
38	Grassy Pond	3504	0	16090	19594	0	0	19597	19597	0.02
39	Flax Pond	1752	0	16156	17908	0	0	17903	17903	-0.03
40	Walkers Pond	5256	0	8190	13446	0	0	13454	13454	0.06
41	Elbow Pond	7485	0	9407	16891	0	0	16890	16890	-0.01
42	Matthews Pond	5256	0	26545	31801	0	0	31796	31796	-0.02
43	Aunt Edies Pond	2920	0	12990	15910	0	0	15912	15912	0.01
44	unnamed pond, North Chatham	1168	0	8103	9271	0	0	9272	9272	0.01
45	Cornelius Pond	1752	0	16551	18303	0	0	18300	18300	-0.02
46	Robbins Pond	4672	0	72283	76955	0	0	76954	76954	0.00
47	Stillwater Pond	2920	0	21124	24044	0	0	24056	24056	0.05
48	Josephs Pond	3504	0	25256	28760	0	0	28717	28717	-0.15
49	White Pond	2344	0	13259	15603	0	0	15607	15607	0.02
50	Lovers Lake	6530	0	26733	33263	0	0	33261	33261	-0.01
51	Bucks Pond	5418	0	42940	48358	0	0	48410	48410	0.11
52	Unnamed pond near Bucks Pond	1330	0	9992	11322	0	0	11320	11320	-0.02
53	Unnamed pond near Goose Pond	2442	0	16742	19184	0	0	19182	19182	-0.01
54	Unnamed pond, near Frost Fish Creek	2442	0	17062	19504	0	0	19533	19533	0.15
55	Mill Pond	4499	0	65948	70447	0	0	70443	70443	-0.01
56	Eagle Pond	1168	0	13999	15167	0	0	15168	15168	0.01
57	Goose Pond	5256	0	27693	32949	0	0	32953	32953	0.01

Table 1. Identifiers, names, hydrologic budgets, and model errors for ponds in the Plymouth-Carver and Cape Cod aquifer systems.—Continued

[Pond identifiers are unique within each aquifer system; MMR is abbreviation for Massachusetts Military Reservation]

Identifier	Pond name	Inflow				Outflow				
		Recharge (cubic feet per day)	Surface-water inflow (cubic feet per day)	Ground-water inflow (cubic feet per day)	Total inflow (cubic feet per day)	Pumping from wells (cubic feet per day)	Surface-water outflow (cubic feet per day)	Ground-water outflow (cubic feet per day)	Total outflow (cubic feet per day)	Model error (percent)
Monomoy Aquifer—Continued										
58	Schoolhouse Pond	3026	0	8384	11411	0	0	11429	11429	0.16
59	Emery Pond	2549	0	1945	4493	0	0	4494	4494	0.02
60	Flax Pond	3331	0	45339	48670	0	0	48670	48670	0.00
61	White Pond	4672	0	11953	16625	0	0	16620	16620	-0.03
62	Perch Pond	2574	0	1929	4503	0	0	4503	4503	0.00
63	Sand Pond	3331	0	22066	25397	0	0	25395	25395	-0.01
64	Reservoir	14016	0	96039	110055	0	15842	94274	110116	0.06
65	Paddocks Pond	2336	0	26415	28751	0	0	28753	28753	0.01
66	Grass Pond	2920	0	38301	41221	0	0	41237	41237	0.04
67	Fresh Pond	4672	0	22220	26892	0	0	26912	26912	0.07
68	Skinequit Pond	4488	0	44314	48802	0	0	48965	48965	0.33
69	Run Pond	1990	0	8080	10071	0	0	10067	10067	-0.04
70	Kelleys Pond	9138	0	2605	11743	0	0	11775	11775	0.27
71	Fund Pond	1990	0	2037	4028	0	0	4017	4017	-0.26
72	Olivers Pond	2986	0	3270	6256	0	0	6249	6249	-0.11
73	Andrews Pond	1990	0	10577	12567	0	0	12567	12567	0.00
Lower Cape Aquifer										
3	Unnamed pond near Great Pond	1754	0	864	2617	0	0	2595	2595	0.84
4	Great Pond	3507	0	567	4074	0	0	4026	4026	1.19
5	Bennett Pond	2630	0	85	2715	0	0	2678	2678	1.38
6	Duck Pond	1754	0	245	1999	0	0	1976	1976	1.13
7	Clapps Pond	11398	0	3790	15188	0	0	15064	15064	0.82
8	Shank Painter Pond (west)	6138	0	4406	10544	0	0	10487	10487	0.54
9	Shank Painter Pond (east)	4384	0	2655	7039	0	0	7001	7001	0.54
10	Featherbed Swamp	1024	0	2889	3913	0	0	3914	3914	-0.02
11	Great Pond	5120	0	2684	7804	0	0	7809	7809	-0.07
12	Unnamed pond north of Round Pond	512	0	2093	2605	0	0	2605	2605	0.00

Table 1. Identifiers, names, hydrologic budgets, and model errors for ponds in the Plymouth-Carver and Cape Cod aquifer systems.—Continued

[Pond identifiers are unique within each aquifer system; MMR is abbreviation for Massachusetts Military Reservation]

Identifier	Pond name	Inflow				Outflow				
		Recharge (cubic feet per day)	Surface-water inflow (cubic feet per day)	Ground-water inflow (cubic feet per day)	Total inflow (cubic feet per day)	Pumping from wells (cubic feet per day)	Surface-water outflow (cubic feet per day)	Ground-water outflow (cubic feet per day)	Total outflow (cubic feet per day)	Model error (percent)
		Lower Cape Aquifer								
13	Round Pond	1024	0	7591	8615	0	0	8615	8615	0.00
14	Horseleech Pond	4608	0	40383	44991	0	0	44991	44991	0.00
15	Snow Pond	1024	0	3418	4442	0	0	4443	4443	-0.02
16	Gull Pond	15872	0	42753	58625	0	0	58628	58628	-0.01
17	Ryder Pond	3072	0	12558	15630	0	0	15632	15632	-0.01
18	Long Pond	6144	0	7160	13304	0	0	13332	13332	-0.21
19	Great Pond	8192	0	11105	19297	0	0	19348	19348	-0.26
20	Dyer Pond	2048	0	4931	6979	0	0	6991	6991	-0.18
21	Duck Pond	1024	0	802	1826	0	0	1837	1837	-0.62
22	Unnamed pond near Minister Pond	512	0	2283	2795	0	0	2794	2794	0.05
23	Unnamed pond near Minister Pond	1024	0	5102	6126	0	0	6123	6123	0.05
24	Minister Pond	5338	0	34119	39457	0	0	39440	39440	0.04
25	Great Pond	16749	0	51737	68486	0	0	68448	68448	0.06
26	Depot Pond	4608	0	13485	18093	0	0	18080	18080	0.07
27	Unnamed pond near Great Pond	512	0	4547	5059	0	0	5059	5059	0.01
28	Jemima Pond	1024	0	5372	6396	0	0	6393	6393	0.04
29	Widow Harding Pond	1024	0	7108	8132	0	0	8131	8131	0.02
30	Mill Pond	4384	0	6233	10617	0	0	10608	10608	0.09
31	Herring Pond	5632	0	29590	35222	0	0	35209	35209	0.04
32	Unnamed pond near Mill Pond	1536	0	14532	16068	0	12752	3315	16067	0.00
33	Higgins Pond	4608	0	53245	57853	0	28166	29688	57854	0.00
34	Williams Pond	2048	0	25435	27483	0	0	27482	27482	0.00
35	Herring Pond	3584	0	4482	8066	0	0	8066	8066	0.00
36	Slough Pond	4608	0	29760	34368	0	0	34369	34369	0.00

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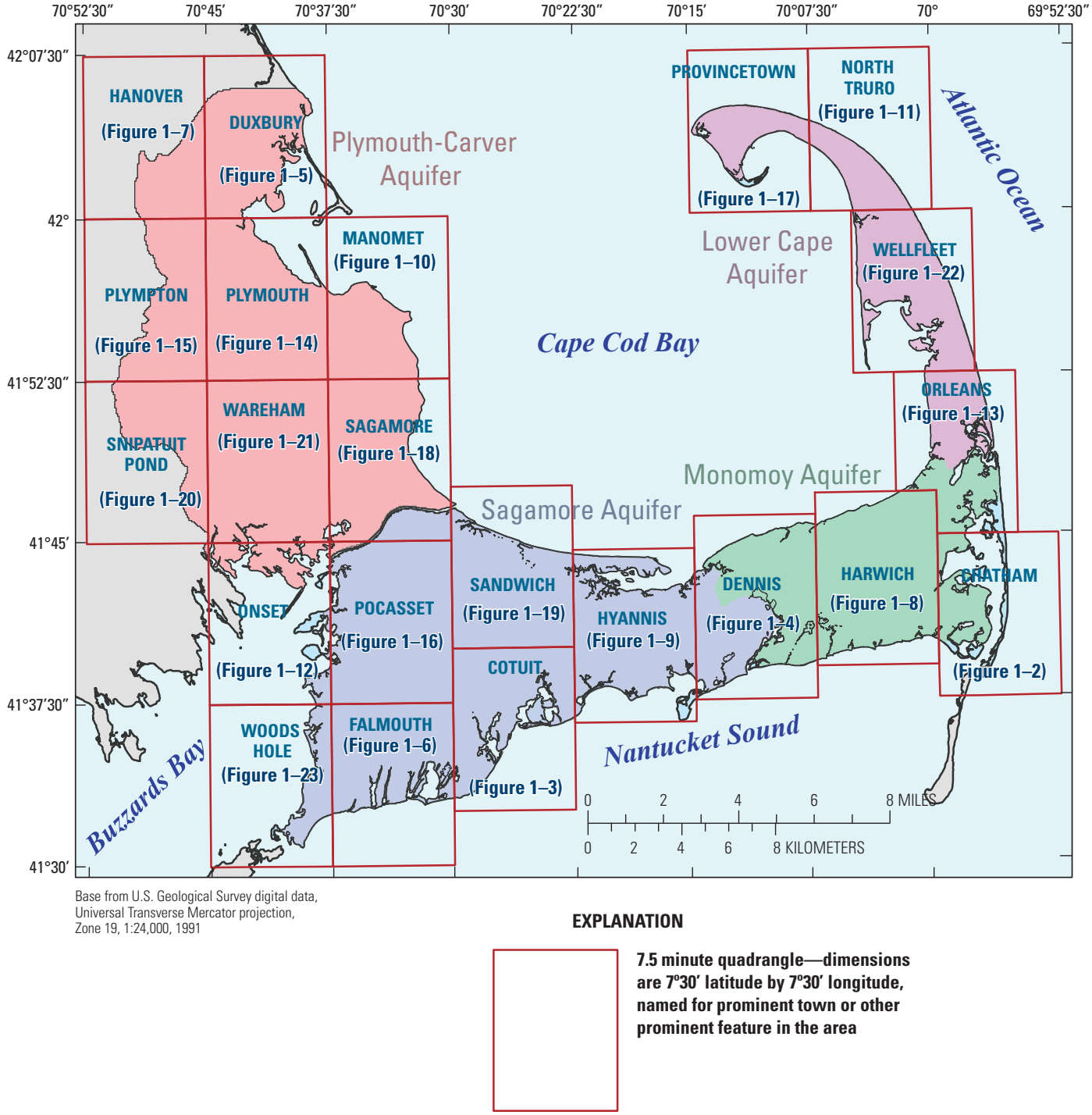
Appendix 1. Locations of Simulated Ponds on U.S. Geological Survey Topographic Quadrangles

Figure 1–1. Map showing locations of U.S. Geological Survey Topographic Quadrangle that encompass coastal aquifers of southeastern Massachusetts.

Figures 1–2 through 1–23. Maps showing locations of simulated ponds on U.S. Geological Survey Topographic Quadrangles

1–2. Chatham.
1–3. Cotuit.
1–4. Dennis.
1–5. Duxbury.
1–6. Falmouth.
1–7. Hanover.
1–8. Harwich.
1–9. Hyannis.
1–10. Manomet.
1–11. North Truro.
1–12. Onset.
1–13. Orleans.
1–14. Plymouth.
1–15. Plympton.
1–16. Pocasset.
1–17. Provincetown.
1–18. Sagamore.
1–19. Sandwich.
1–20. Snipatuit Pond.
1–21. Wareham.
1–22. Wellfleet.
1–23. Woods Hole.

Table 1–1. Pond identifier, name, location, topographic quadrangle, and simulated ponds in the Plymouth-Carver and Cape Cod aquifer systems.



Base from U.S. Geological Survey digital data, Universal Transverse Mercator projection, Zone 19, 1:24,000, 1991

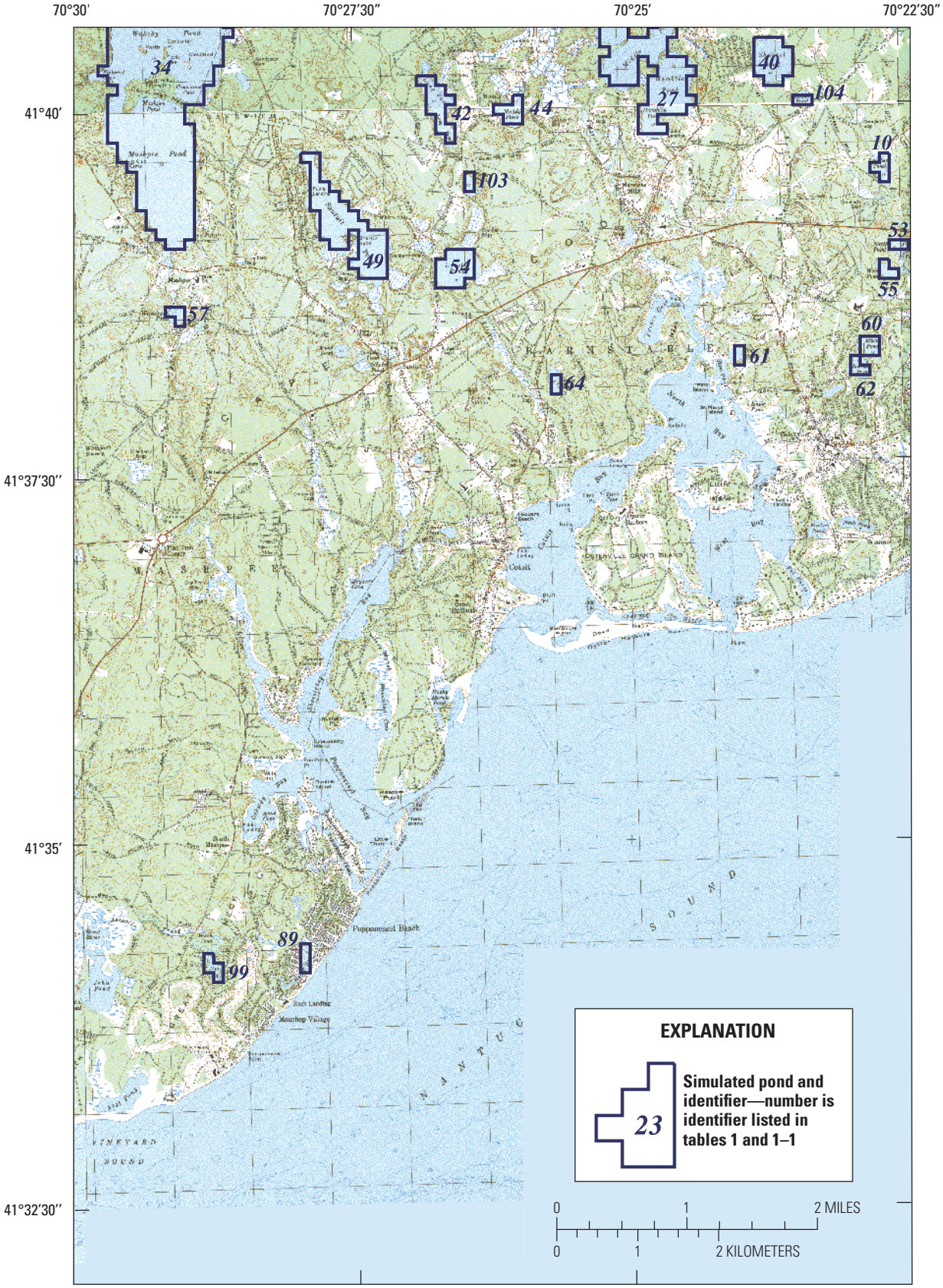
EXPLANATION

7.5 minute quadrangle—dimensions are 7°30′ latitude by 7°30′ longitude, named for prominent town or other prominent feature in the area

Figure 1–1. Location of U.S. Geological Survey Topographic Quadrangle that encompass coastal aquifers of southeastern Massachusetts.

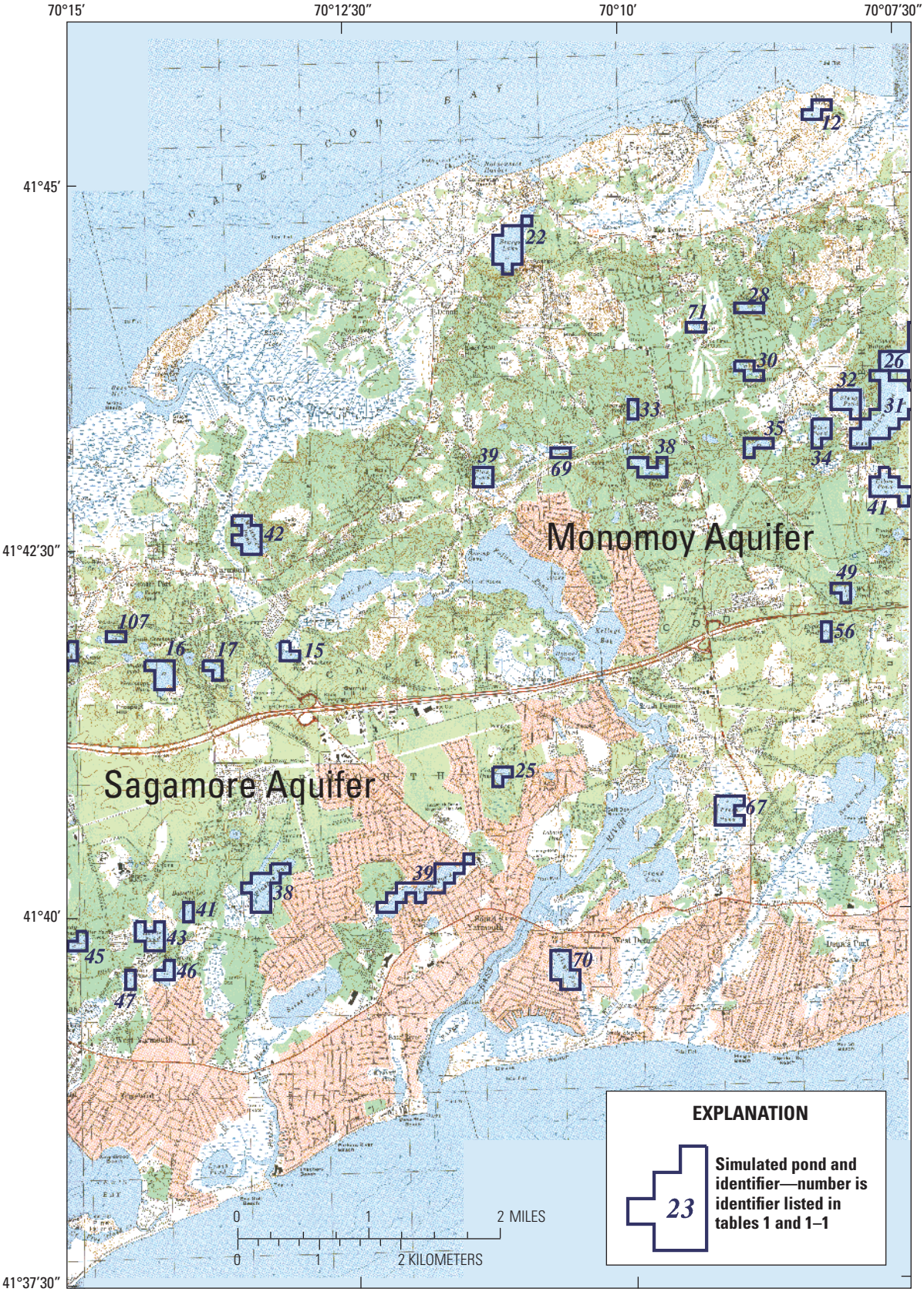
Base from U.S. Geological Survey, DRG, 1:25,000, 2001
Lambert conformal conical projection, 1983 North American datum
Massachusetts coordinate system mainland zone

Figure 1–2. Chatham.



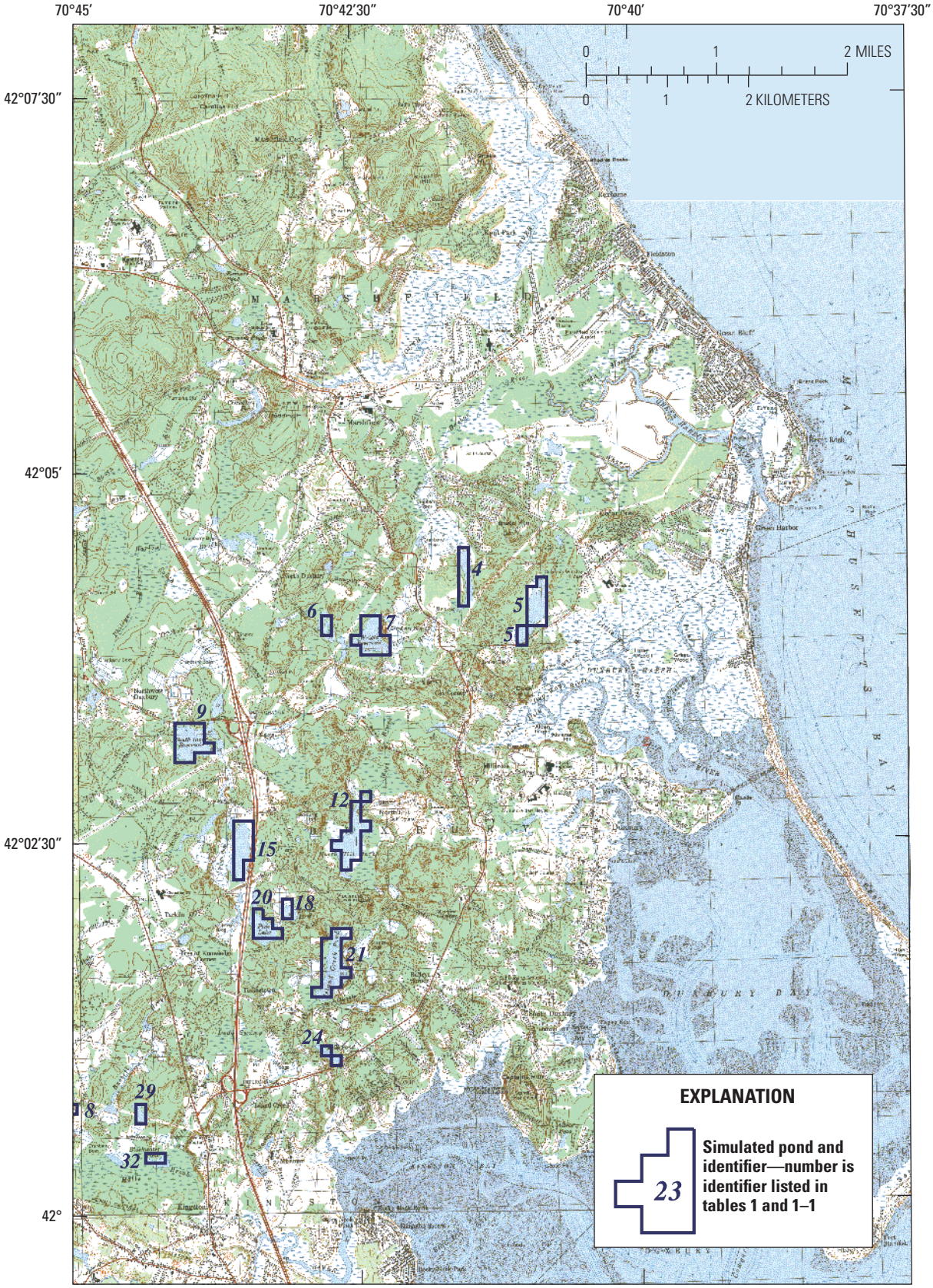
Base from U.S. Geological Survey, DRG, 1:25,000, 2001
Lambert conformal conical projection, 1983 North American datum
Massachusetts coordinate system mainland zone

Figure 1–3. Cotuit.



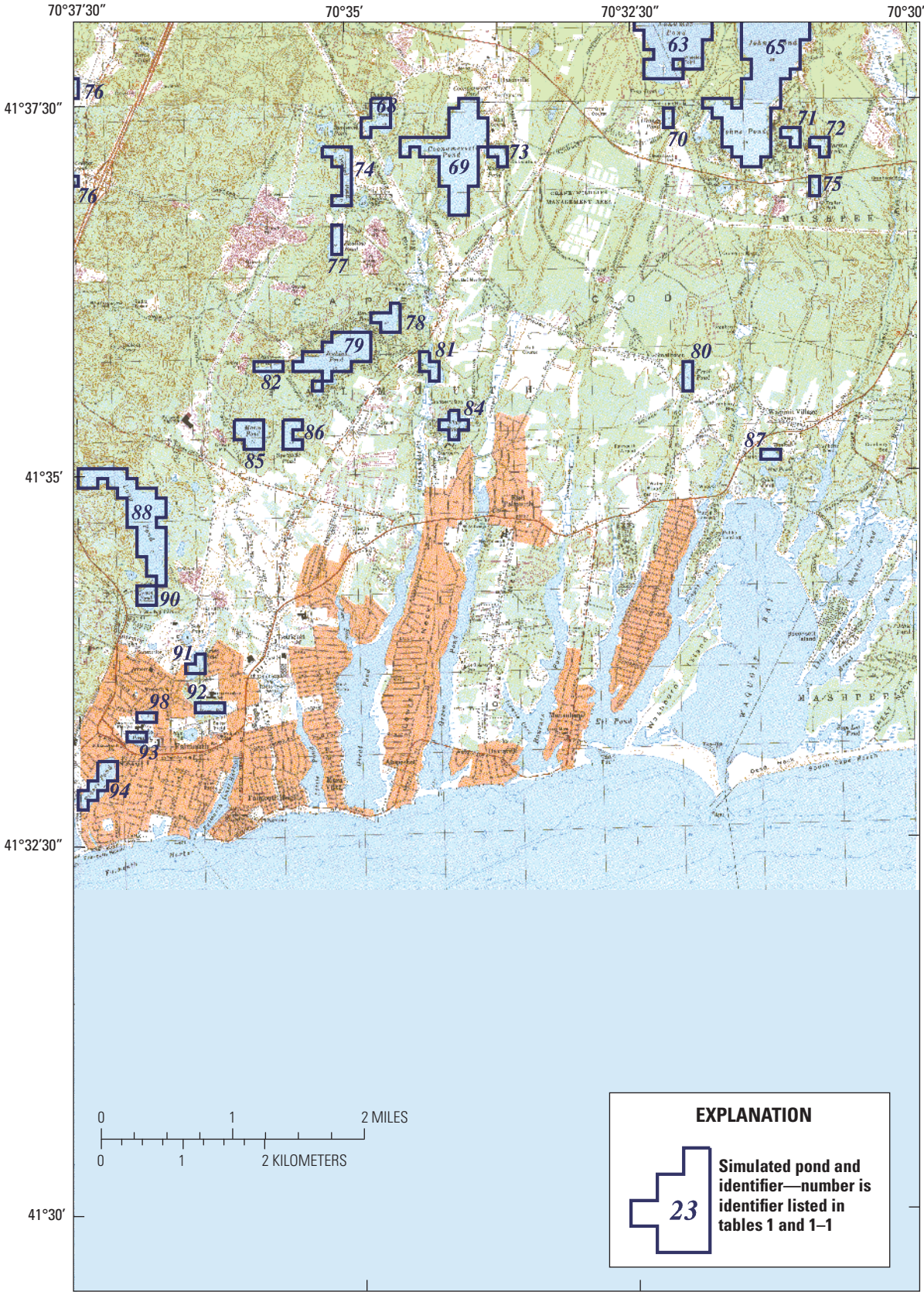
Base from U.S. Geological Survey, DRG, 1:25,000, 2001
Lambert conformal conical projection, 1983 North American datum
Massachusetts coordinate system mainland zone

Figure 1–4. Dennis.



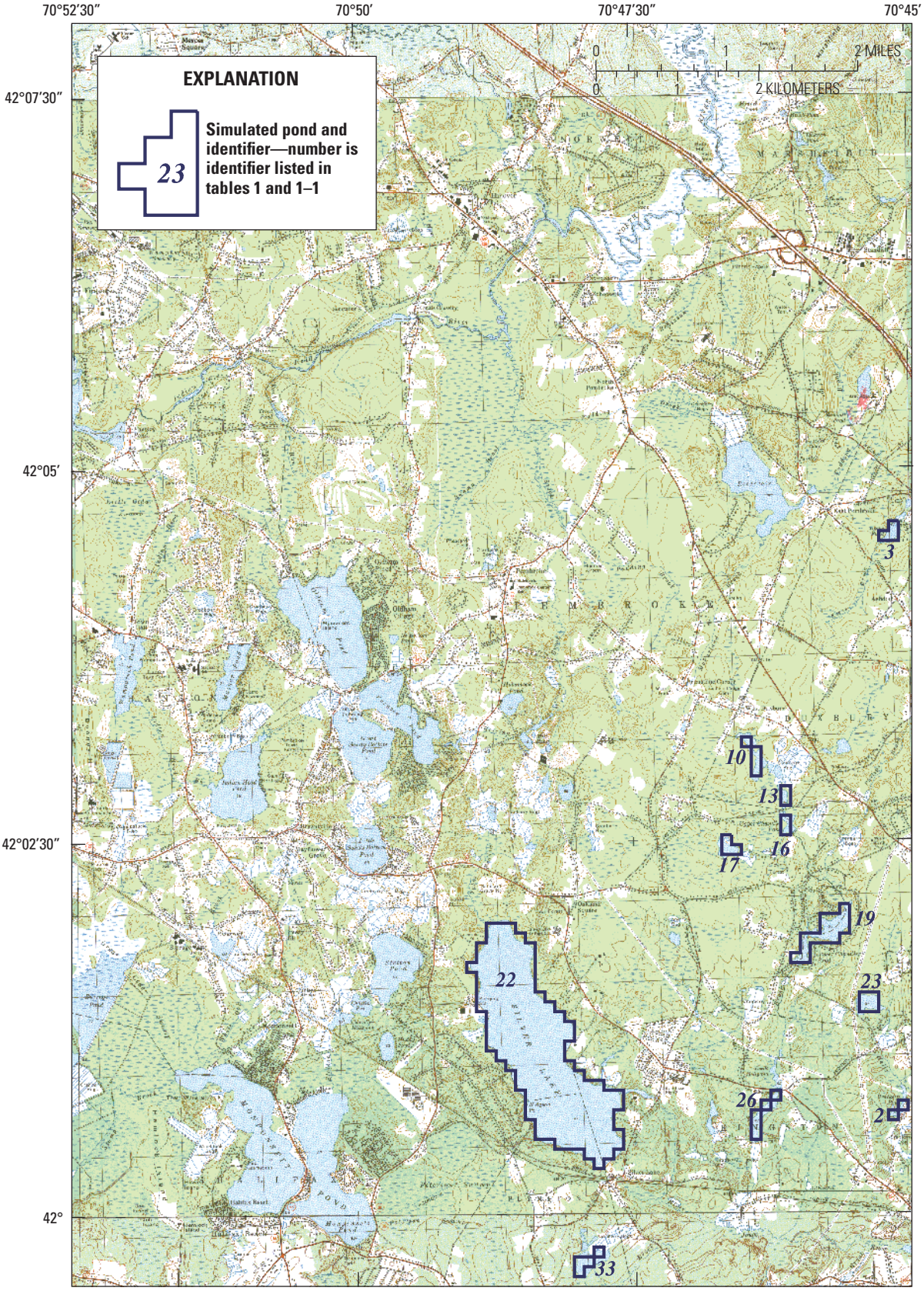
Base from U.S. Geological Survey, DRG, 1:25,000, 2001
Lambert conformal conical projection, 1983 North American datum
Massachusetts coordinate system mainland zone

Figure 1–5. Duxbury.



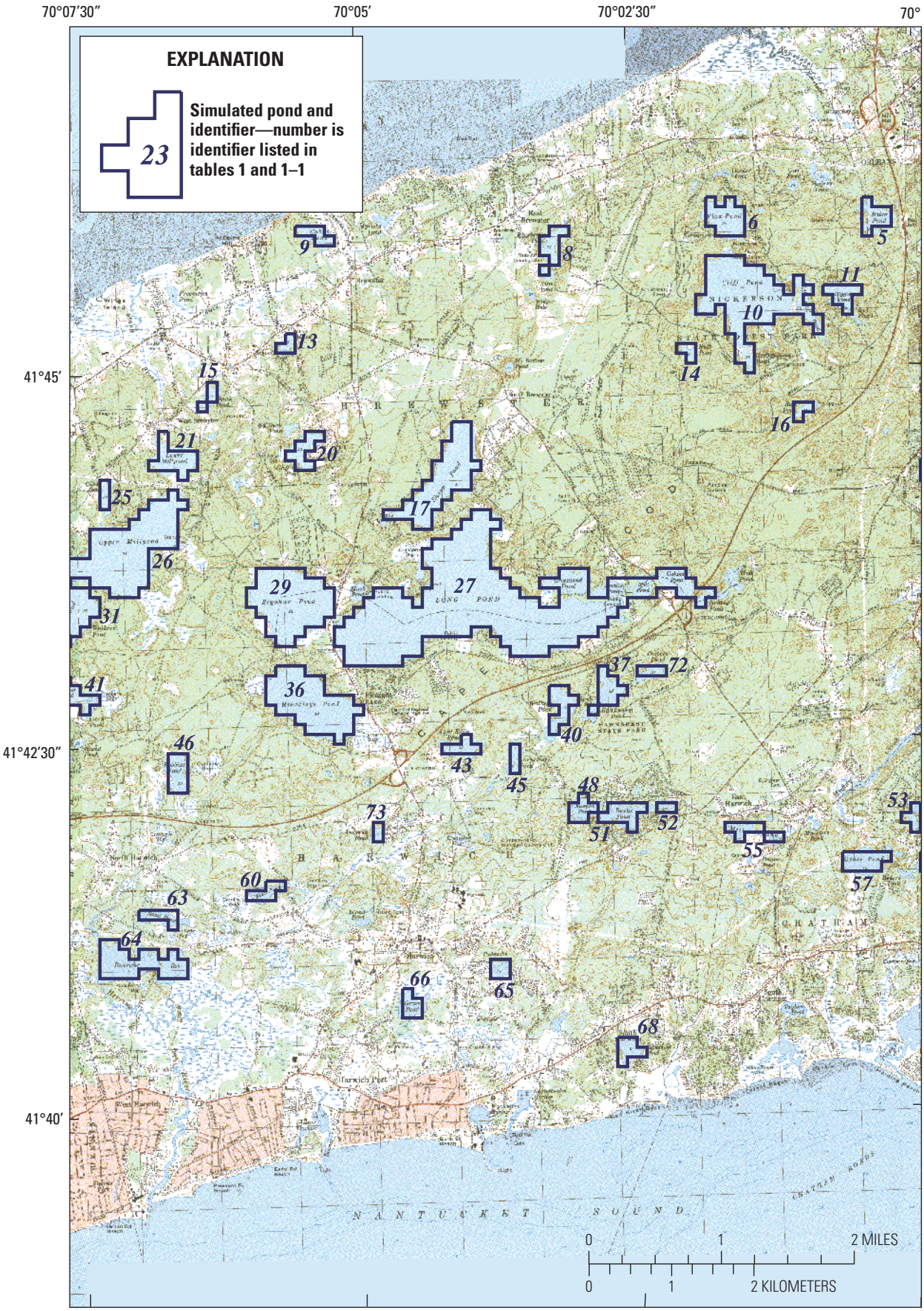
Base from U.S. Geological Survey, DRG, 1:25,000, 2001
Lambert conformal conical projection, 1983 North American datum
Massachusetts coordinate system mainland zone

Figure 1–6. Falmouth.



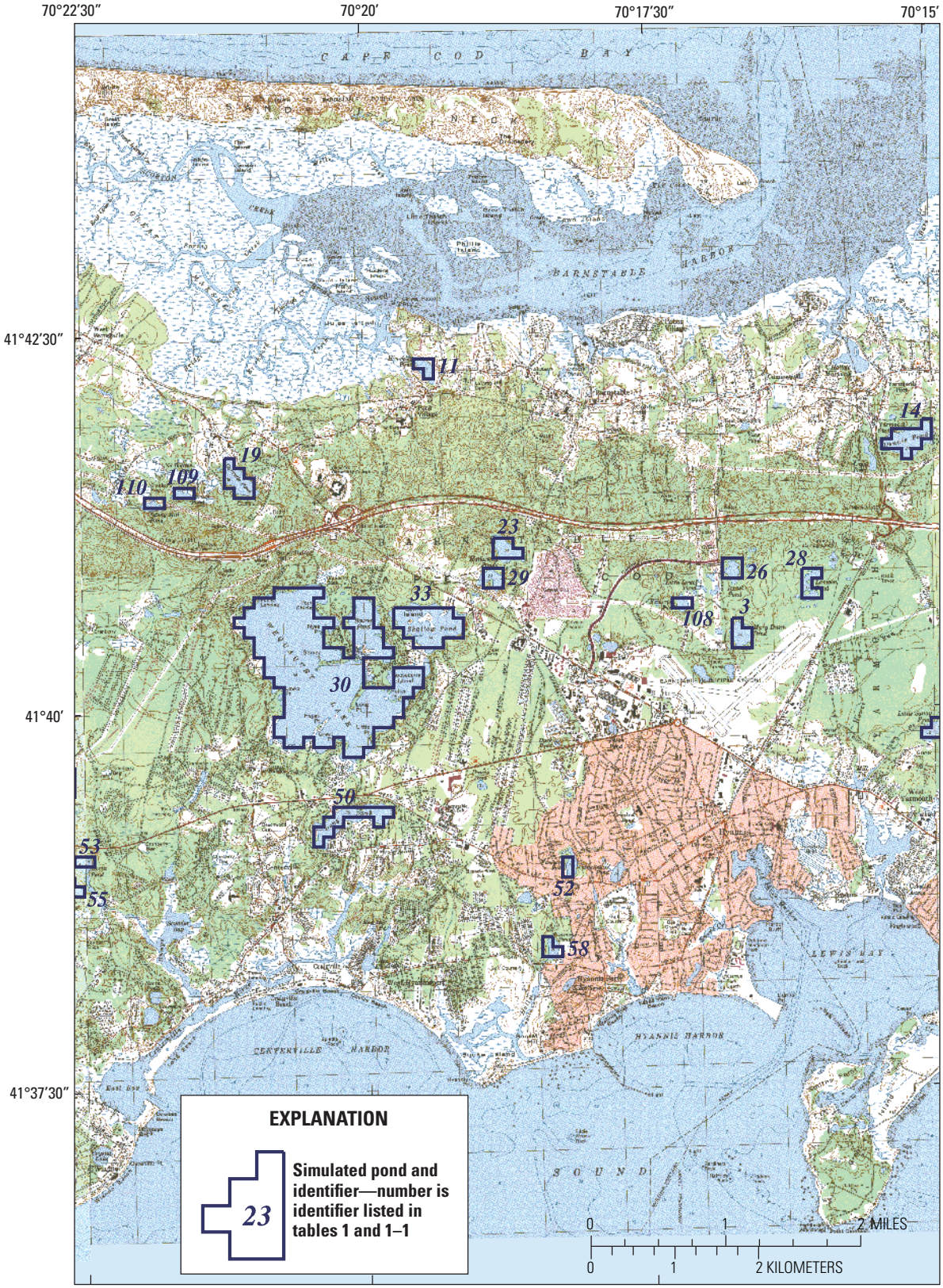
Base from U.S. Geological Survey, DRG, 1:25,000, 2001
Lambert conformal conical projection, 1983 North American datum
Massachusetts coordinate system mainland zone

Figure 1–7. Hanover.



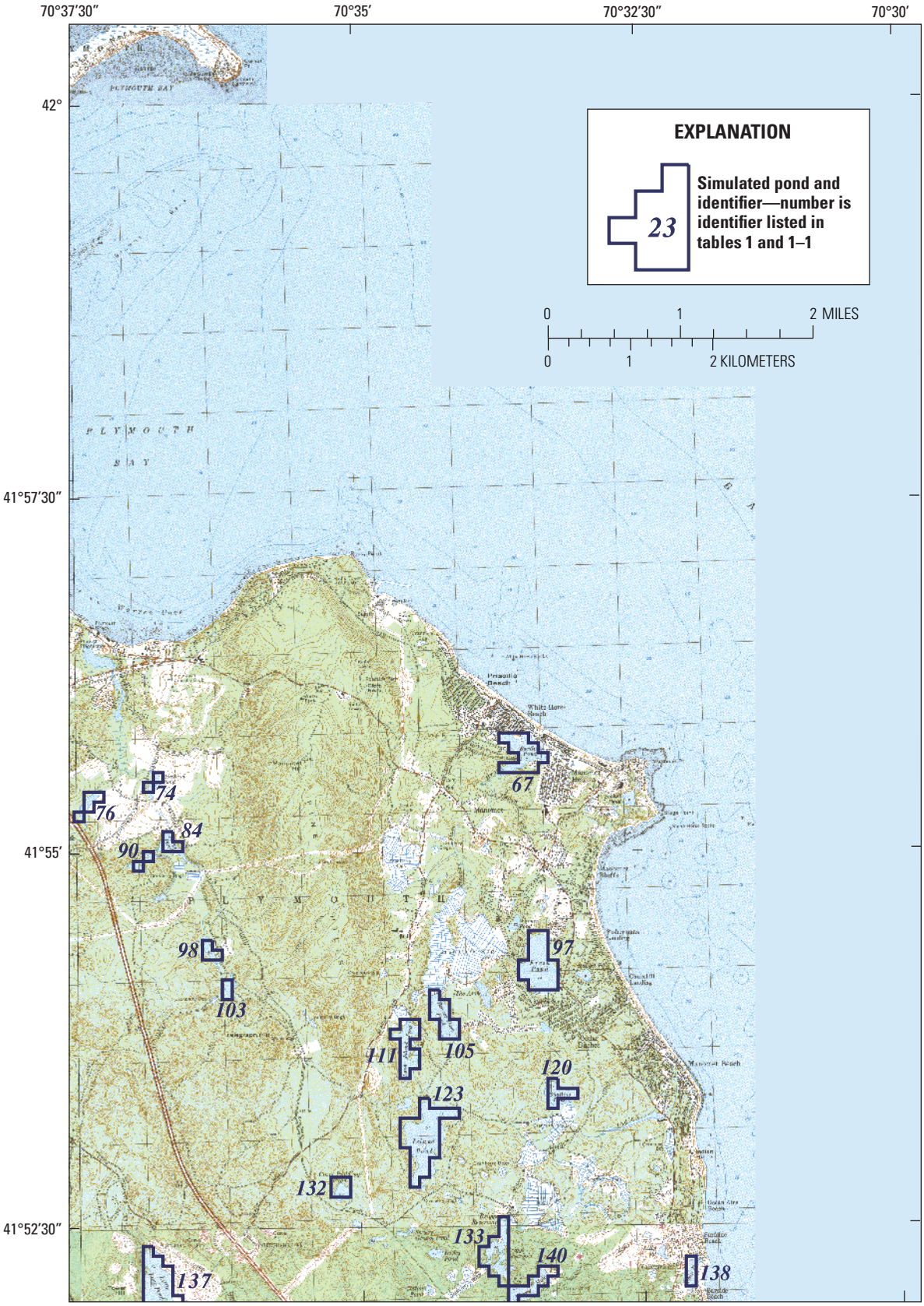
Base from U.S. Geological Survey, DRG, 1:25,000, 2001
Lambert conformal conical projection, 1983 North American datum
Massachusetts coordinate system mainland zone

Figure 1–8. Harwich.



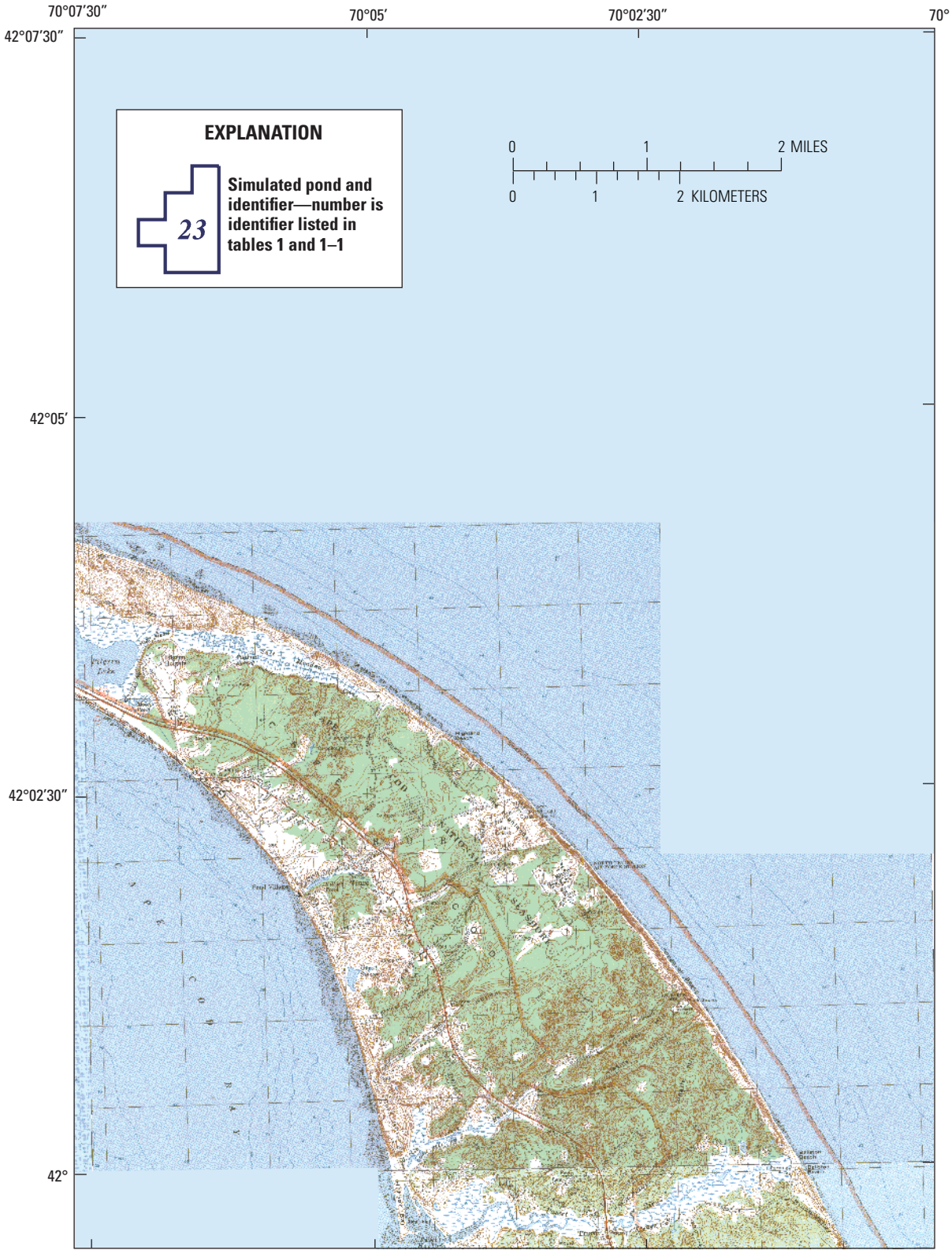
Base from U.S. Geological Survey, DRG, 1:25,000, 2001
Lambert conformal conical projection, 1983 North American datum
Massachusetts coordinate system mainland zone

Figure 1–9. Hyannis.



Base from U.S. Geological Survey, DRG, 1:25,000, 2001
Lambert conformal conical projection, 1983 North American datum
Massachusetts coordinate system mainland zone

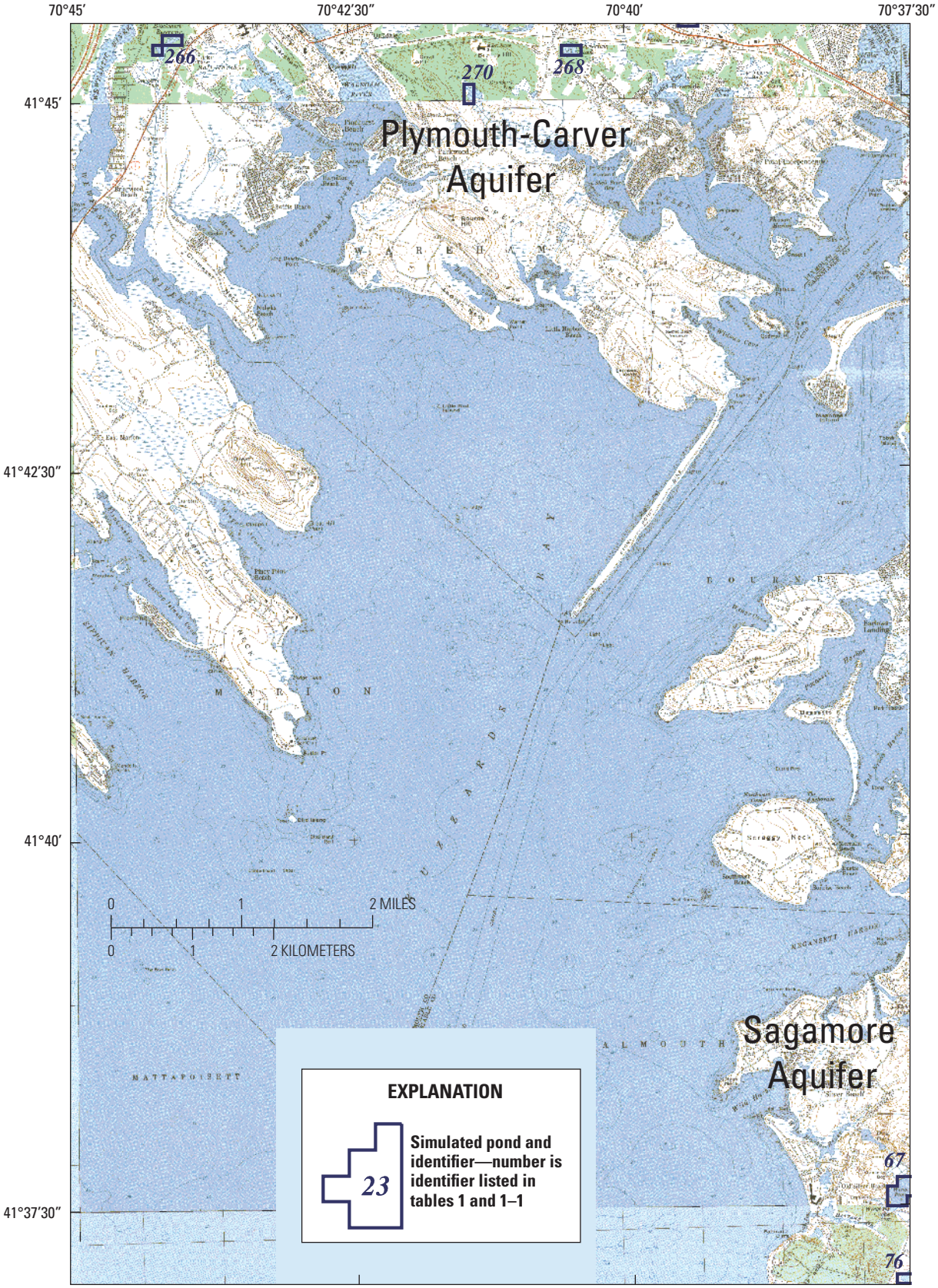
Figure 1–10. Manomet.



Base from U.S. Geological Survey, DRG, 1:25,000, 2001
Lambert conformal conical projection, 1983 North American datum
Massachusetts coordinate system mainland zone

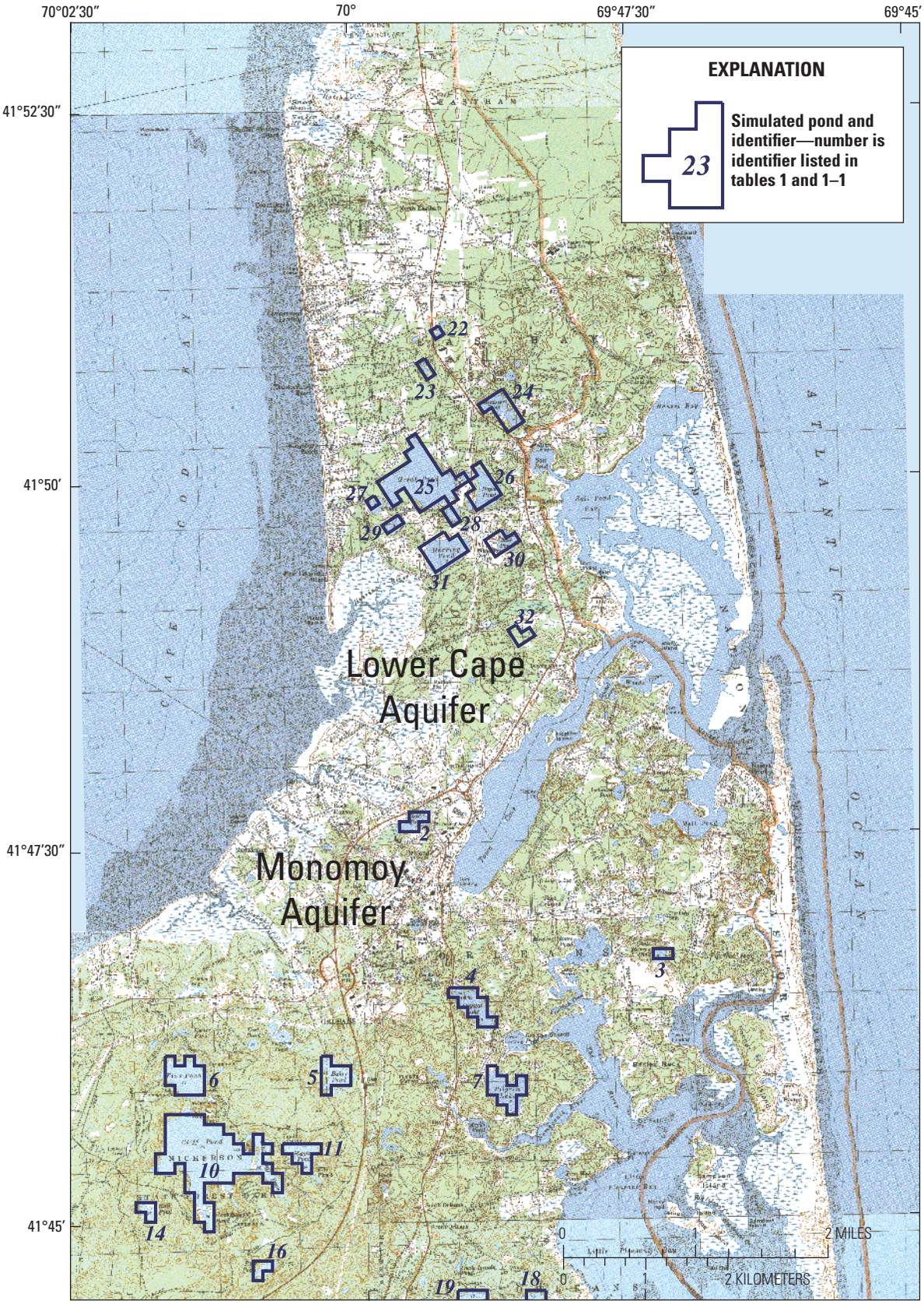
No modeled ponds on North Truro quadrangle.

Figure 1–11. North Truro.



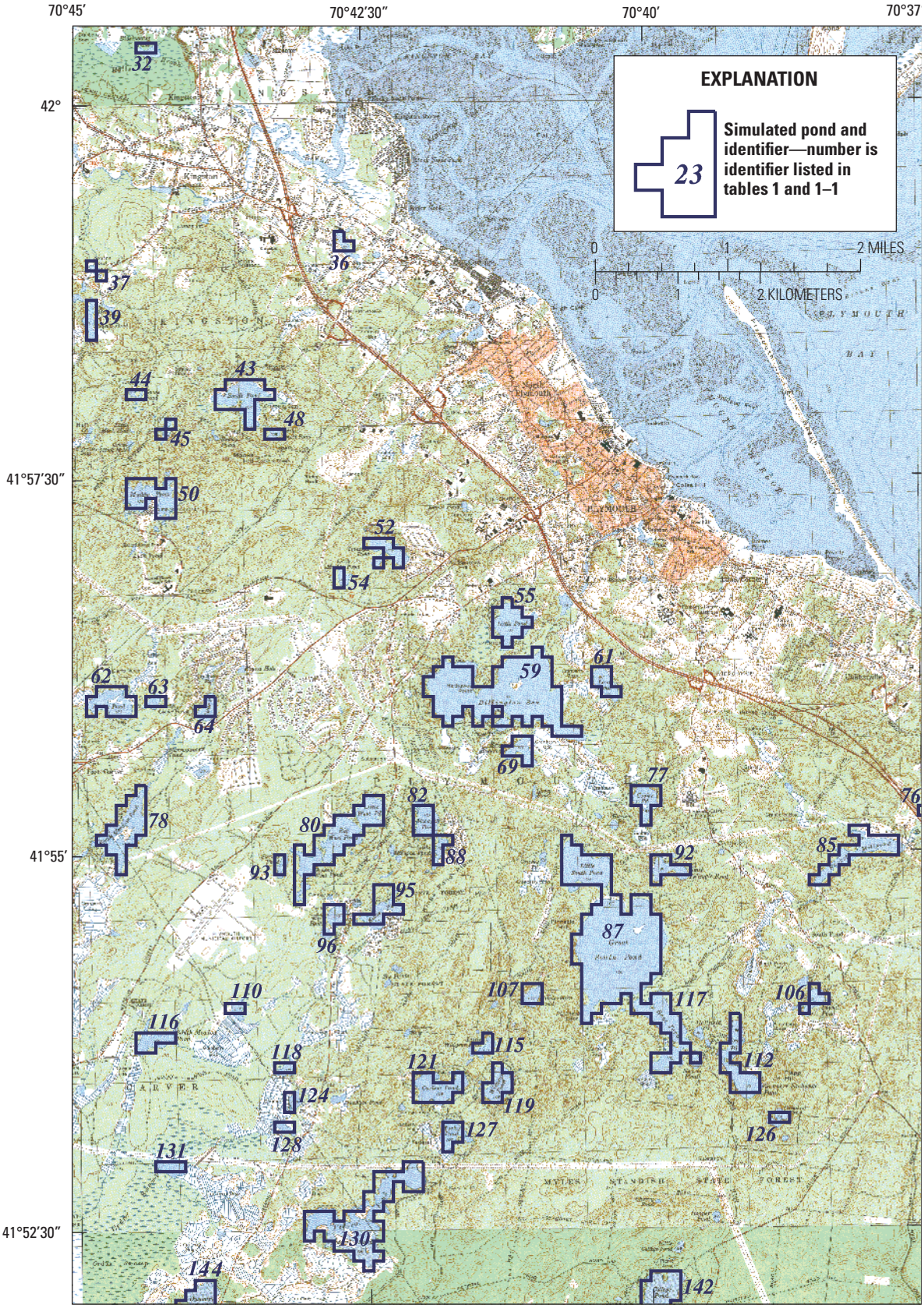
Base from U.S. Geological Survey, DRG, 1:25,000, 2001
Lambert conformal conical projection, 1983 North American datum
Massachusetts coordinate system mainland zone

Figure 1–12. Onset.



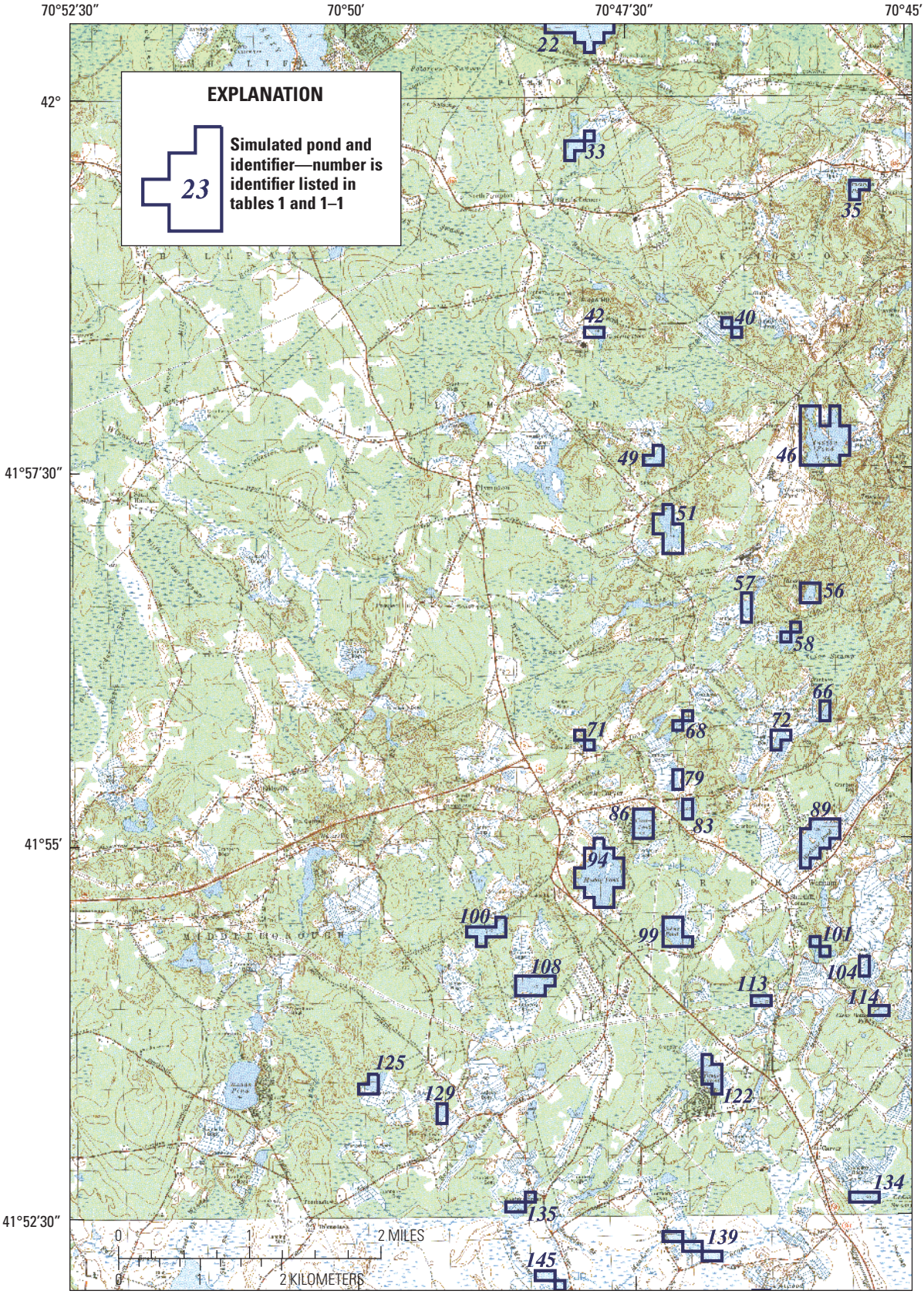
Base from U.S. Geological Survey, DRG, 1:25,000, 2001
Lambert conformal conical projection, 1983 North American datum
Massachusetts coordinate system mainland zone

Figure 1–13. Orleans.



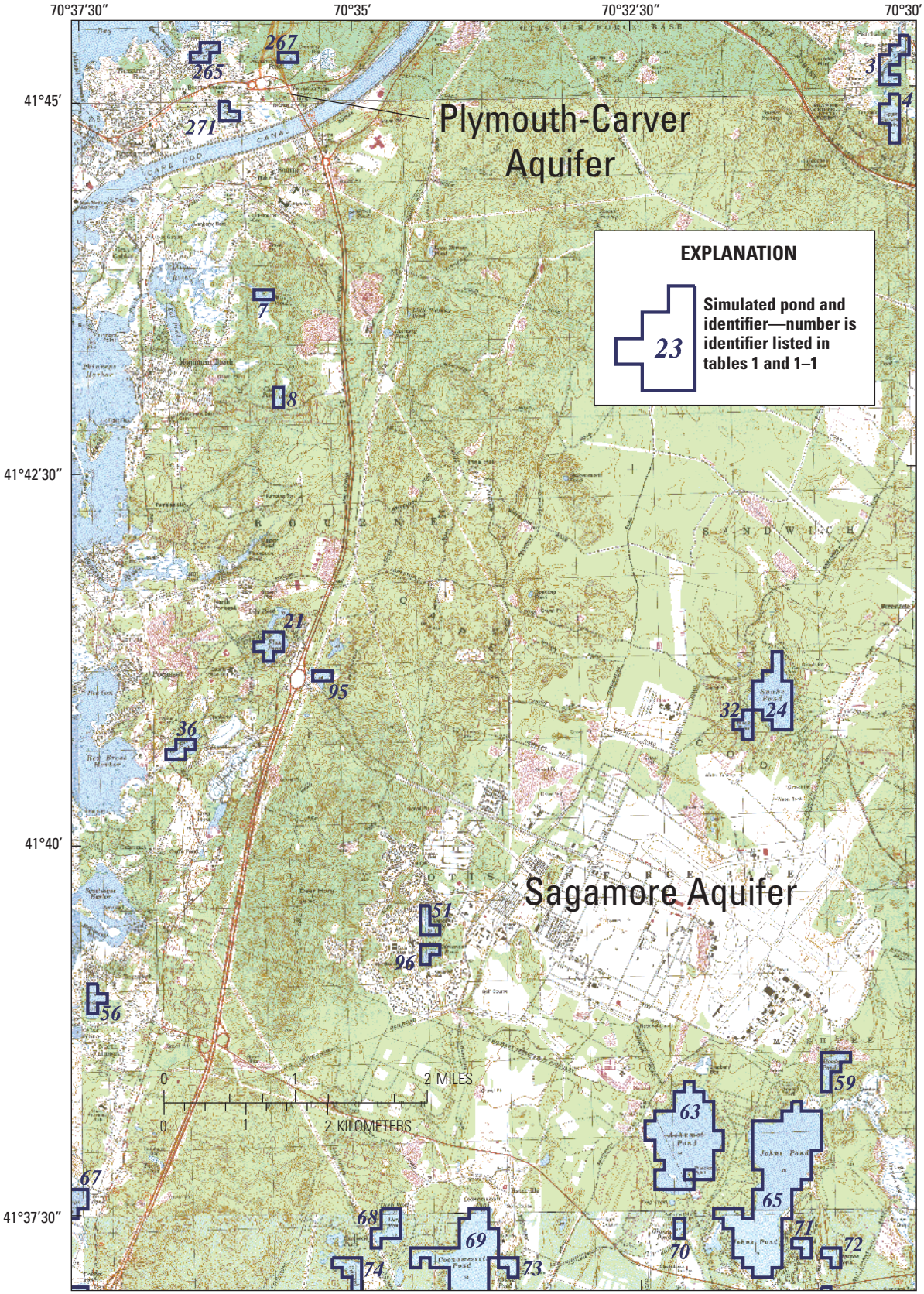
Base from U.S. Geological Survey, DRG, 1:25,000, 2001
Lambert conformal conical projection, 1983 North American datum
Massachusetts coordinate system mainland zone

Figure 1–14. Plymouth.



Base from U.S. Geological Survey, DRG, 1:25,000, 2001
Lambert conformal conical projection, 1983 North American datum
Massachusetts coordinate system mainland zone

Figure 1–15. Plympton.

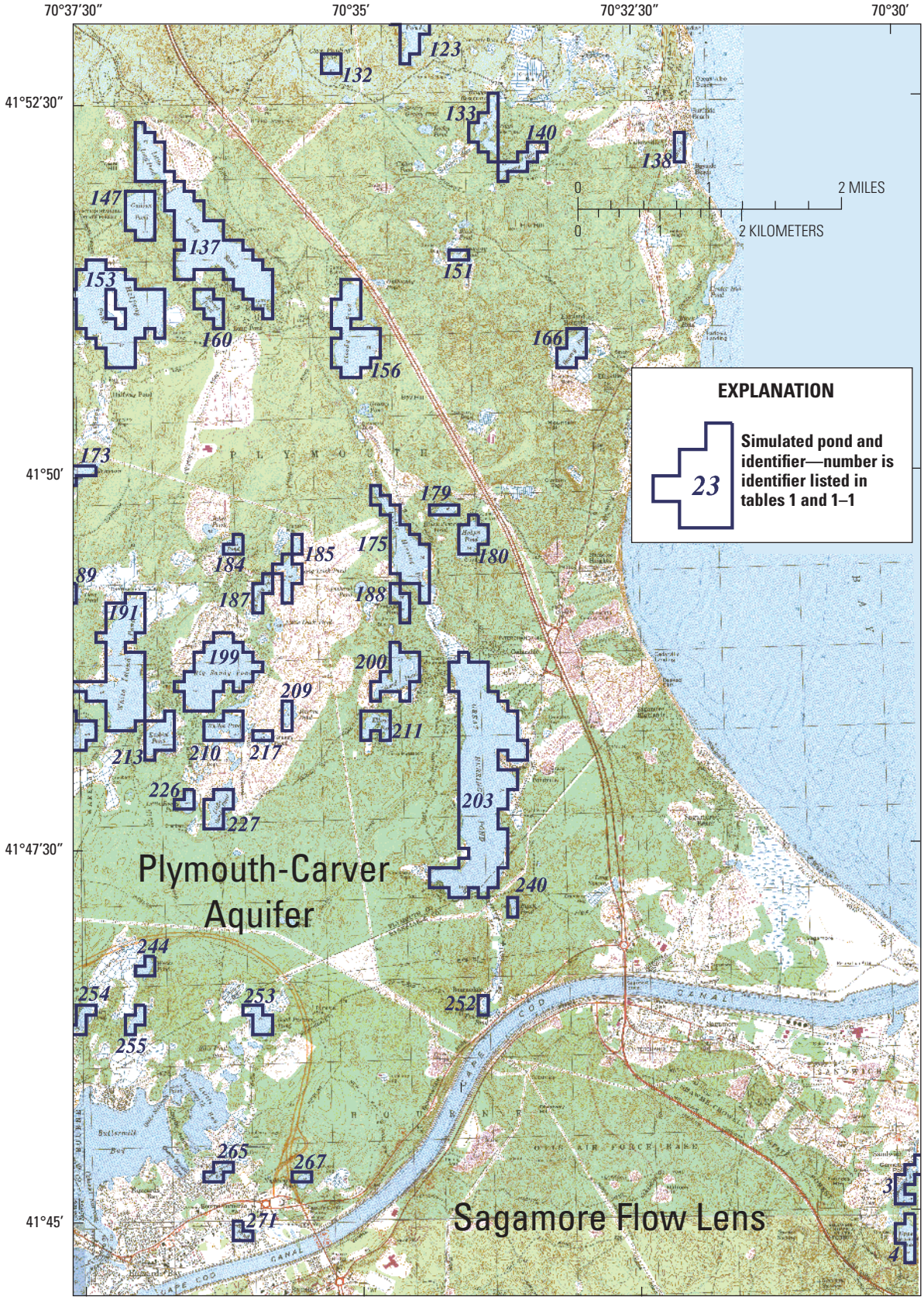


Base from U.S. Geological Survey, DRG, 1:25,000, 2001
Lambert conformal conical projection, 1983 North American datum
Massachusetts coordinate system mainland zone

Figure 1–16. Pocasset.

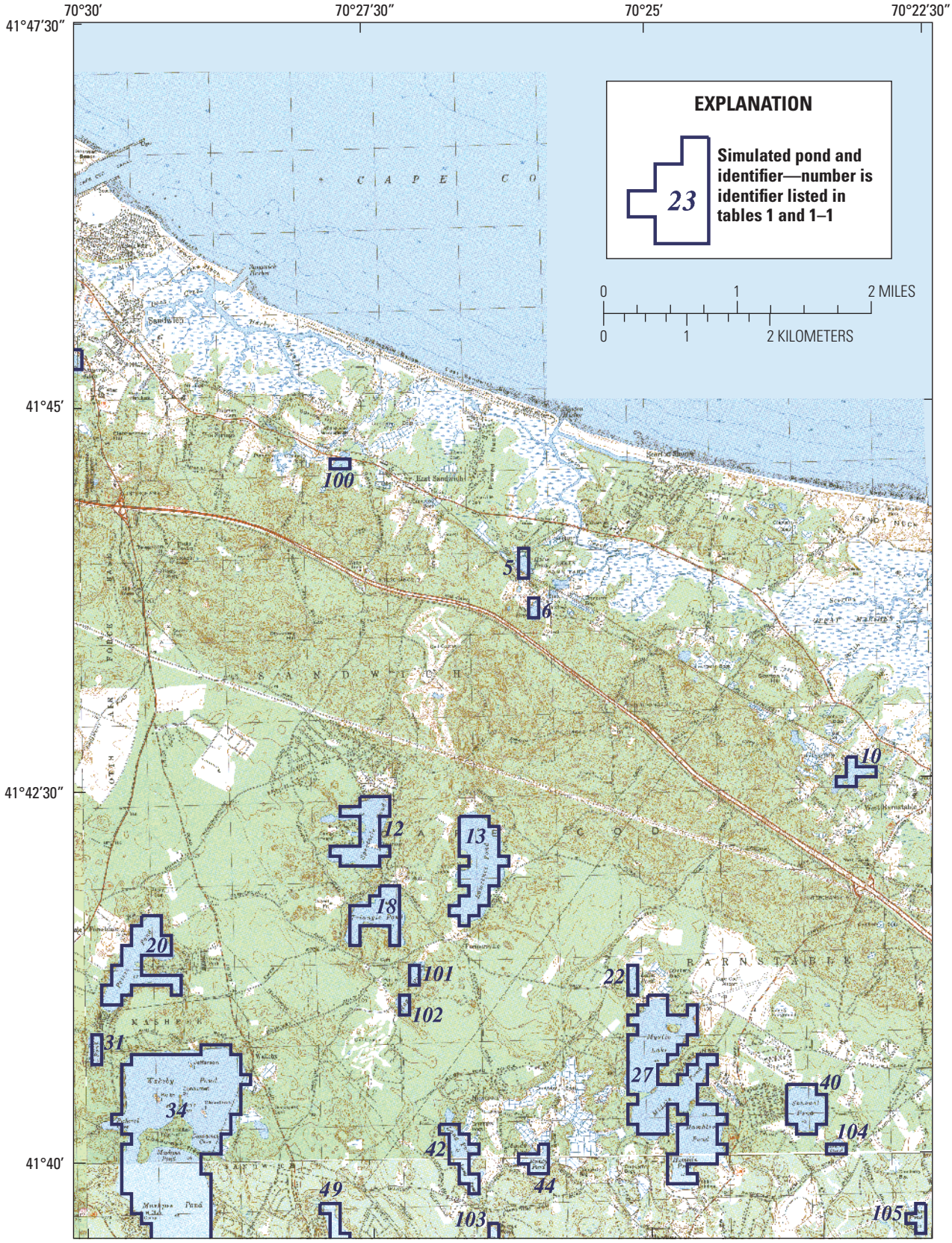
Base from U.S. Geological Survey, DRG, 1:25,000, 2001
Lambert conformal conical projection, 1983 North American datum
Massachusetts coordinate system mainland zone

Figure 1–17. Provincetown.



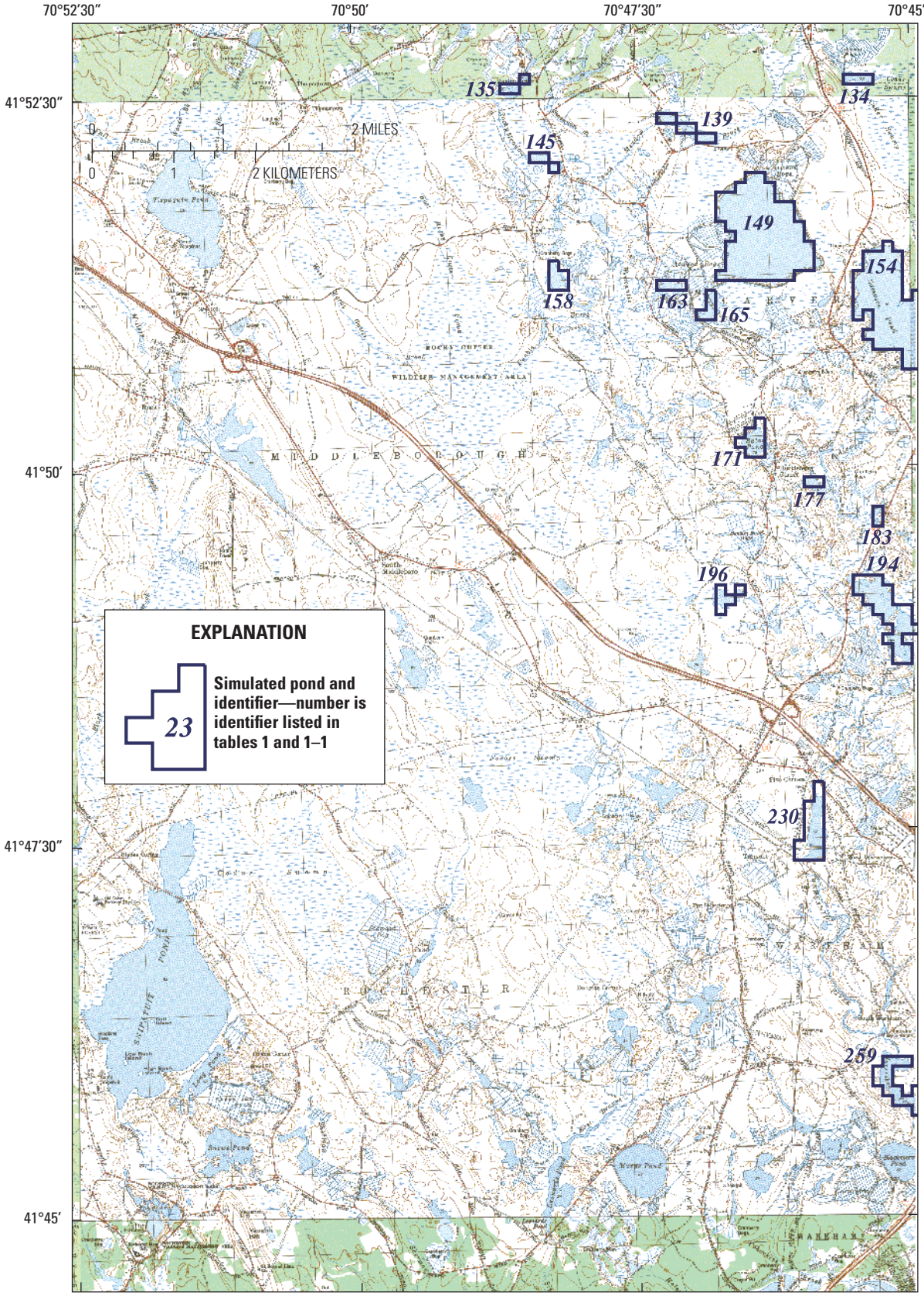
Base from U.S. Geological Survey, DRG, 1:25,000, 2001
Lambert conformal conical projection, 1983 North American datum
Massachusetts coordinate system mainland zone

Figure 1–18. Sagamore.



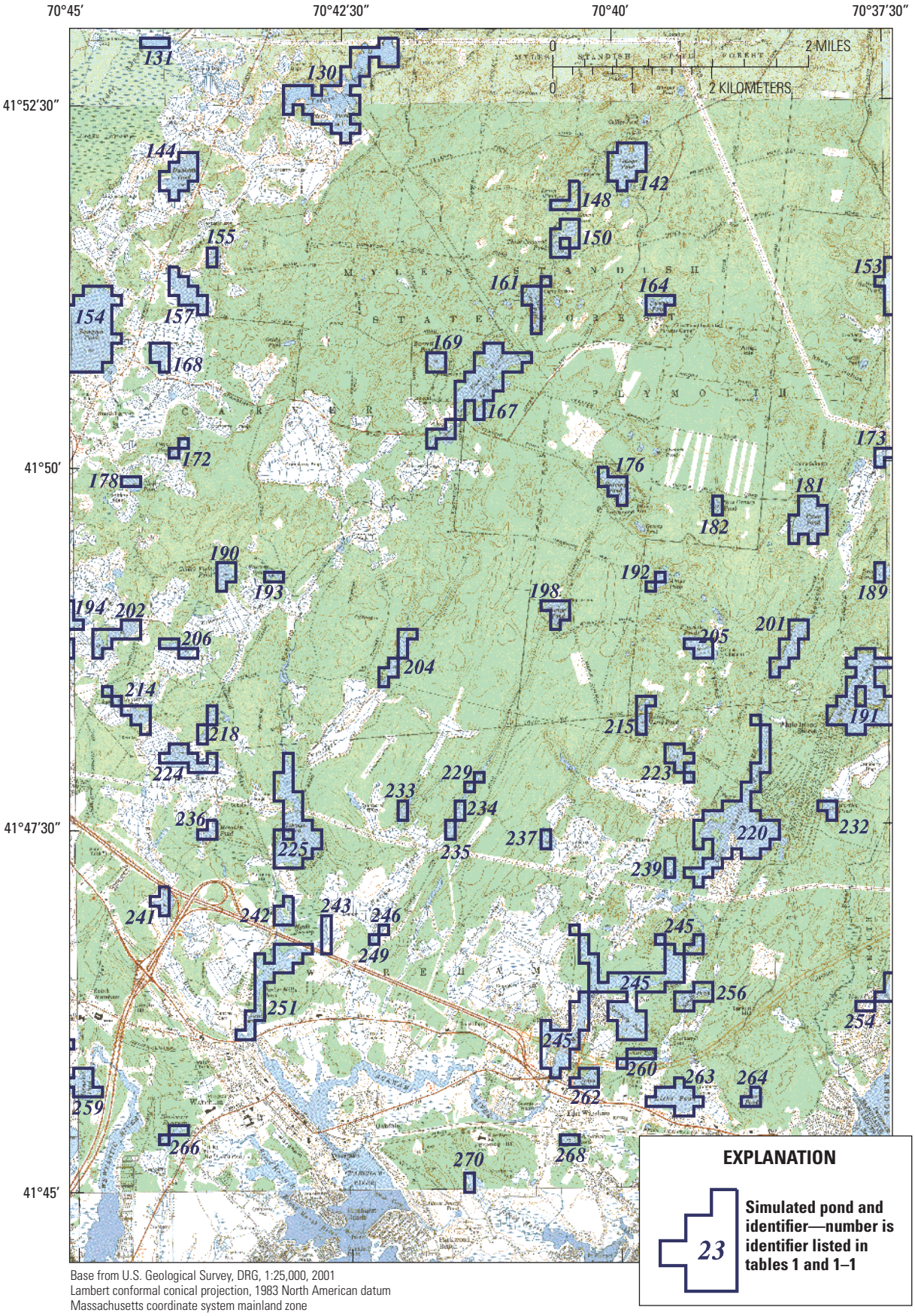
Base from U.S. Geological Survey, DRG, 1:25,000, 2001
Lambert conformal conical projection, 1983 North American datum
Massachusetts coordinate system mainland zone

Figure 1–19. Sandwich.



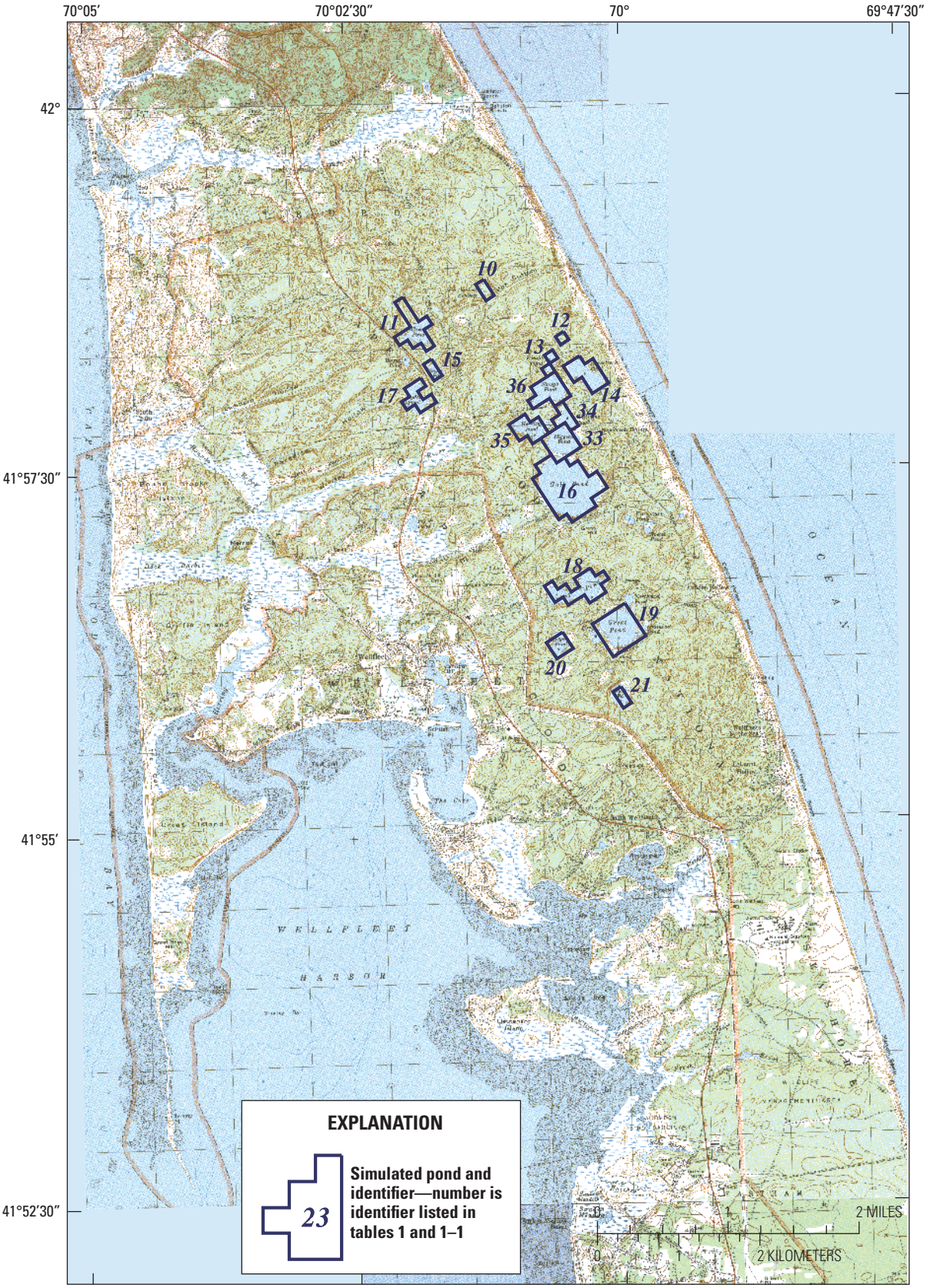
Base from U.S. Geological Survey, DRG, 1:25,000, 2001
Lambert conformal conical projection, 1983 North American datum
Massachusetts coordinate system mainland zone

Figure 1–20. Snipatuit Pond.



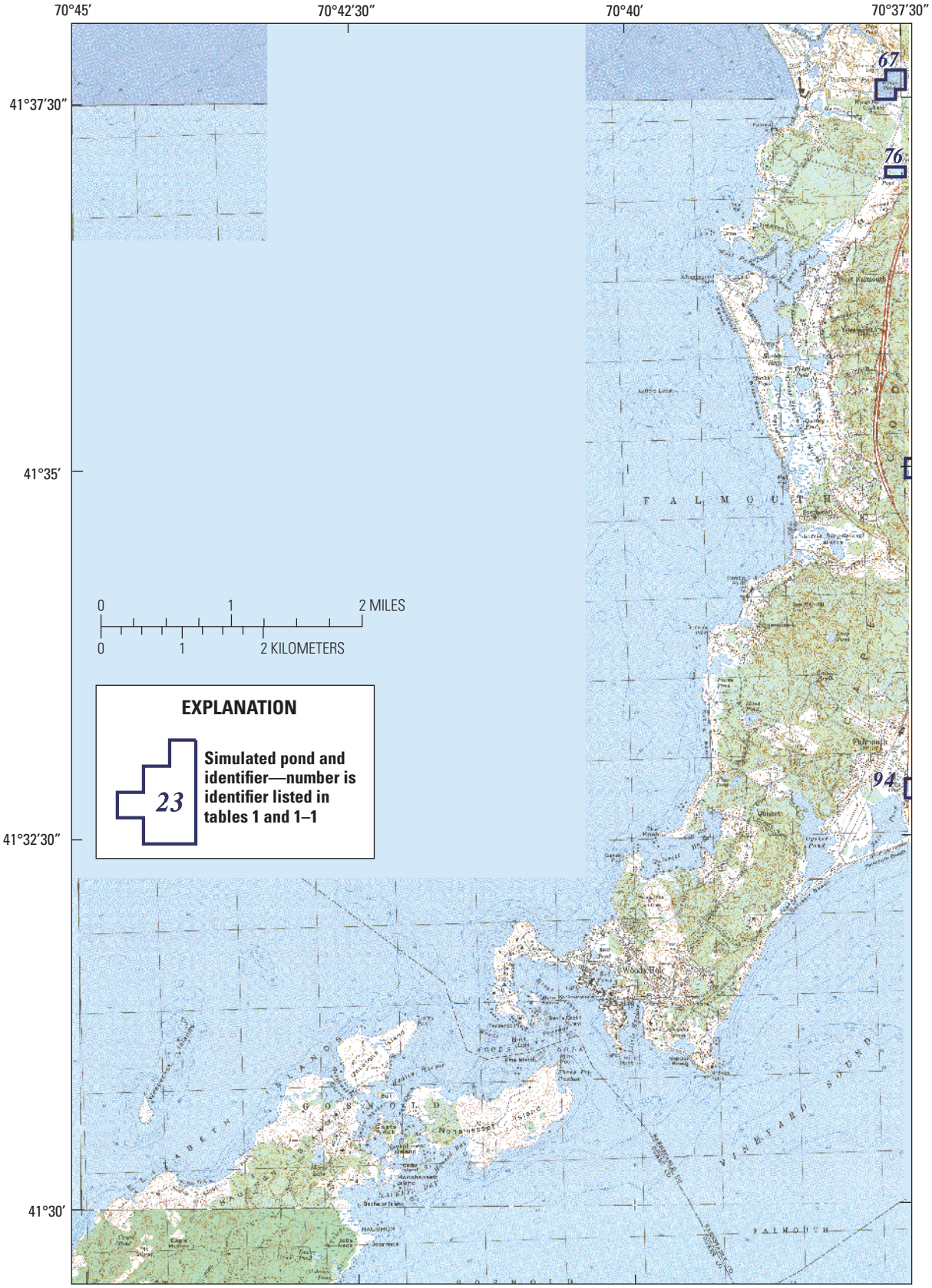
Base from U.S. Geological Survey, DRG, 1:25,000, 2001
Lambert conformal conical projection, 1983 North American datum
Massachusetts coordinate system mainland zone

Figure 1–21. Wareham.



Base from U.S. Geological Survey, DRG, 1:25,000, 2001
Lambert conformal conical projection, 1983 North American datum
Massachusetts coordinate system mainland zone

Figure 1–22. Wellfleet.



Base from U.S. Geological Survey, DRG, 1:25,000, 2001
Lambert conformal conical projection, 1983 North American datum
Massachusetts coordinate system mainland zone

Figure 1–23. Woods Hole.

Table 1–1. Identifiers, names, locations, names of U.S. Geological Survey topographic quadrangles and modeled areas of ponds in the Plymouth-Carver aquifer, Sagamore, Monomoy, and Lower Cape aquifers.

[Pond identifiers are unique within each aquifer system. Datum is North American Datum 1983. MMR, Massachusetts Military Reservation]

Identifier	Pond name	Latitude (decimal degrees)	Longitude, (decimal degrees)	Town	Name of topographic quadrangle	Modeled area (acres)
			Plymouth–Carver Aquifer			
3	Keene Pond	42.07558	-70.75212	Duxbury	Hanover	11.02
4	Unnamed pond north of Green Harbor Brook	42.07078	-70.69178	Marshfield	Duxbury	22.04
5	Unnamed pond north of Bourne Wharf River	42.06850	-70.68002	Marshfield	Duxbury	40.40
6	Unnamed west of Wright Reservoir	42.06543	-70.71247	Duxbury	Duxbury	7.35
7	Wright Reservoir	42.06428	-70.70512	Duxbury	Duxbury	40.40
9	South River Reservoir	42.05350	-70.73324	Duxbury	Duxbury	44.08
10	Unnamed pond, West Duxbury	42.05046	-70.77304	Duxbury	Hanover	14.69
12	North Hill Marsh	42.04235	-70.70834	Duxbury	Duxbury	47.75
13	Unnamed pond, West Duxbury	42.04604	-70.76867	Duxbury	Hanover	7.35
15	Lorings Bogs	42.04137	-70.72602	Duxbury	Duxbury	36.73
16	Upper Chandler Pond	42.04275	-70.76871	Duxbury/Pembroke	Hanover	7.35
17	Unnamed pond, near Town Forest	42.04061	-70.77757	Pembroke	Hanover	11.02
18	Round Pond	42.03364	-70.71875	Duxbury	Duxbury	7.35
19	Lower Chandler Pond	42.03064	-70.76296	Duxbury/Pembroke	Hanover	51.42
20	Pine Lake	42.03256	-70.72171	Duxbury	Duxbury	22.04
21	Island Creek Pond	42.02810	-70.71146	Duxbury	Duxbury	55.10
22	Silver Lake	42.01883	-70.80579	Pembroke/ Plympton/Kingston	Hanover	639.12
23	Unnamed pond along Halls Brook	42.02291	-70.75569	Duxbury	Hanover	14.69
24	Mill Pond	42.01712	-70.71159	Duxbury	Duxbury	7.35
26	Reeds Millpond	42.00985	-70.77350	Kingston	Hanover	18.37
28	Bracketts Pond	42.01190	-70.75140	Kingston	Hanover	7.35
29	Unnamed pond near Winthrop Street	42.01074	-70.74111	Kingston	Duxbury	7.35
32	Blackwater Pond	42.00633	-70.73822	Kingston	Duxbury	7.35
33	Unnamed pond near Jones River Brook	41.99465	-70.80016	Plympton	Plympton	14.69
35	Crossman Pond	41.98999	-70.75754	Kingston	Plympton	11.02
36	Foundry Pond	41.98418	-70.71053	Kingston	Plymouth	11.02
37	Soules Pond	41.98113	-70.74588	Kingston	Plymouth	7.35
39	Russell Pond	41.97565	-70.74741	Kingston	Plymouth	14.69
40	Unnamed pond near Jones River Brook	41.97364	-70.77539	Kingston	Plympton	7.35

Table 1–1. Identifiers, names, locations, names of U.S. Geological Survey topographic quadrangles and modeled areas of ponds in the Plymouth-Carver aquifer, Sagamore, Monomoy, and Lower Cape aquifers.—Continued

[Pond identifiers are unique within each aquifer system. Datum is North American Datum 1983. MMR, Massachusetts Military Reservation]

Identifier	Pond name	Latitude (decimal degrees)	Longititude, (decimal degrees)	Town	Name of topographic quadrangle	Modeled area (acres)
			Plymouth–Carver Aquifer—Continued			
42	Dennetts Pond	41.97377	-70.79745	Plympton	Plympton	7.35
43	Smelt Pond	41.96782	-70.72544	Kingston	Plymouth	58.77
44	Goose Pond	41.96793	-70.74162	Kingston	Plymouth	7.35
45	Pratt Pond	41.96351	-70.73726	Kingston	Plymouth	7.35
46	Indian Pond	41.96148	-70.76229	Kingston/Plympton	Plympton	91.83
48	Little Smelt Pond	41.96339	-70.71961	Kingston	Plymouth	7.35
49	Unnamed pond near Upland Road	41.95944	-70.78731	Plympton	Plympton	11.02
50	Muddy Pond	41.95693	-70.73881	Kingston	Plymouth	55.10
51	Unnamed pond near Brook Street	41.95175	-70.78593	Plympton	Plympton	36.73
52	Triangle Pond	41.95011	-70.70360	Plymouth	Plymouth	25.71
54	Little Muddy Pond	41.94686	-70.71099	Plymouth	Plymouth	7.35
55	Little Pond	41.94230	-70.68605	Plymouth	Plymouth	44.08
56	Ricketts Pond	41.94393	-70.76543	Carver	Plympton	14.69
57	Unnamed pond near High Street	41.94289	-70.77427	Carver	Plympton	11.02
58	Unnamed pond southwest of Ricketts Pond	41.93956	-70.76842	Carver	Plympton	7.35
59	Billington Sea	41.93462	-70.68762	Plymouth	Plymouth	279.16
61	Lout Pond	41.93561	-70.67144	Plymouth	Plymouth	22.04
62	Darby Pond	41.93392	-70.74497	Plymouth	Plymouth	44.08
63	Little Cedar Pond	41.93387	-70.73762	Plymouth	Plymouth	7.35
64	Clear Pond	41.93272	-70.73028	Plymouth	Plymouth	11.02
66	Unnamed pond near Cedar Swamp	41.93074	-70.76264	Carver	Plympton	7.35
67	Bartlett Pond	41.92705	-70.55836	Plymouth	Manomet	47.75
68	Unnamed pond near Doten Brook	41.92979	-70.78470	Carver	Plympton	7.35
69	Briggs Reservoir	41.92802	-70.68477	Plymouth	Plymouth	22.04
71	Unnamed pond near Cole Mill	41.92878	-70.79942	Carver	Plympton	7.35
72	Unnamed pond near Plymouth Road	41.92859	-70.77002	Carver	Plympton	11.02
74	Howland Pond	41.92529	-70.61278	Plymouth	Manomet	7.35
76	Unnamed pond on Eel River	41.92317	-70.62310	Plymouth	Manomet	14.69
77	Cooks Pond	41.92239	-70.66573	Plymouth	Plymouth	29.38

Table 1–1. Identifiers, names, locations, names of U.S. Geological Survey topographic quadrangles and modeled areas of ponds in the Plymouth-Carver aquifer, Sagamore, Monomoy, and Lower Cape aquifers.—Continued

[Pond identifiers are unique within each aquifer system. Datum is North American Datum 1983. MMR, Massachusetts Military Reservation]

Identifier	Pond name	Latitude (decimal degrees)	Longititude, (decimal degrees)	Town	Name of topographic quadrangle	Modeled area (acres)
			Plymouth–Carver Aquifer—Continued			
78	Fresh Meadow Pond	41.91964	-70.74367	Carver/Plymouth	Plymouth	77.13
79	Unnamed pond near Plymouth Road	41.92320	-70.78478	Carver	Plympton	7.35
80	Little, Big, and Grassy West Ponds	41.91833	-70.71135	Plymouth	Plymouth	113.87
82	Micajah Pond	41.92043	-70.69809	Plymouth	Plymouth	22.04
83	Unnamed pond near Plymouth Road	41.91990	-70.78335	Carver	Plympton	7.35
84	Forge Pond	41.91759	-70.61141	Plymouth	Manomet	11.02
85	Russell Millpond	41.91667	-70.63494	Plymouth	Plymouth	66.12
86	Cooper Pond	41.91885	-70.79071	Carver	Plympton	22.04
87	Great South Pond	41.90596	-70.67035	Plymouth	Plymouth	437.10
88	Little Micajah Pond	41.91712	-70.69666	Plymouth	Plymouth	14.69
89	Wenham Pond	41.91648	-70.76428	Carver	Plympton	47.75
90	Unnamed pond southwest of Forge Pond	41.91543	-70.61585	Plymouth	Manomet	7.35
92	South Triangle Pond	41.91469	-70.66289	Plymouth	Plymouth	25.71
93	Spring Pond	41.91509	-70.72021	Plymouth	Plymouth	7.35
94	Muddy Pond	41.91339	-70.79665	Carver	Plympton	84.48
95	Kings Pond	41.91060	-70.70556	Plymouth	Plymouth	36.73
96	Ellis Pond	41.90955	-70.71292	Plymouth	Plymouth	18.37
97	Fresh Pond	41.90397	-70.55577	Plymouth	Manomet	62.44
98	Unnamed pond near Sandwich Road	41.90547	-70.60571	Plymouth	Manomet	11.02
99	Johns Pond	41.90673	-70.78496	Carver	Plympton	25.71
100	Unnamed pond near Stone Street	41.90691	-70.81288	Middleborough/Carver	Plympton	22.04
101	Unnamed pond near Centre Street	41.90440	-70.76295	Carver	Plympton	7.35
103	Unnamed pond near Valley Road	41.90106	-70.60283	Plymouth	Manomet	7.35
104	Unnamed pond near Pond Street	41.90217	-70.75710	Carver	Plympton	7.35
105	Beaver Dam Pond	41.89860	-70.57054	Plymouth	Manomet	33.06
106	Island Pond	41.90025	-70.64104	Plymouth	Plymouth	14.69
107	Powderhorn Pond	41.90057	-70.68365	Plymouth	Plymouth	14.69
108	Unnamed pond near Forest Street	41.90138	-70.80706	Carver	Plympton	25.71
110	Unnamed pond near airport	41.89978	-70.72774	Plymouth	Plymouth	7.35

Table 1–1. Identifiers, names, locations, names of U.S. Geological Survey topographic quadrangles and modeled areas of ponds in the Plymouth-Carver aquifer, Sagamore, Monomoy, and Lower Cape aquifers.—Continued

[Pond identifiers are unique within each aquifer system. Datum is North American Datum 1983. MMR, Massachusetts Military Reservation]

Identifier	Pond name	Latitude (decimal degrees)	Longititude, (decimal degrees)	Town	Name of topographic quadrangle	Modeled area (acres)
			Plymouth–Carver Aquifer—Continued			
111	Long Island Pond	41.89536	-70.57646	Plymouth	Manomet	40.40
112	Hoyts Pond	41.89266	-70.65290	Plymouth	Plymouth	51.42
113	Unnamed pond near Centre Street	41.89897	-70.77183	Carver	Plympton	7.35
114	Clear Bottom Pond	41.89776	-70.75568	Carver	Plympton	7.35
115	Little Widgeon Pond	41.89512	-70.68960	Plymouth	Plymouth	11.02
116	South Meadow Pond	41.89656	-70.73953	Carver	Plymouth	22.04
117	Negro Pond	41.89380	-70.65876	Plymouth	Plymouth	3.67
118	Unnamed pond near Rocky Neck Road	41.89313	-70.71900	Plymouth	Plymouth	7.35
119	Widgeon pond	41.89072	-70.68818	Plymouth	Plymouth	29.38
120	Shallow Pond	41.88968	-70.55304	Plymouth	Manomet	18.37
121	Curlew Pond	41.89078	-70.69700	Plymouth	Plymouth	44.08
122	Vaughn Pond	41.89024	-70.78074	Carver	Plympton	22.04
123	Island Pond	41.88436	-70.57368	Plymouth	Manomet	91.83
124	Unnamed pond near Federal Furnace Road	41.88874	-70.71906	Plymouth	Plymouth	7.35
125	Unnamed pond near Meadow Street	41.88945	-70.83070	Middleborough	Plympton	11.02
126	Crooked Pond	41.88713	-70.64710	Plymouth	Plymouth	7.35
127	Rocky Pond	41.88528	-70.69560	Plymouth	Plymouth	18.37
128	Unnamed pond near Tremont St	41.88655	-70.72055	Carver	Plymouth	7.35
129	Unnamed pond near Purchase Street	41.88609	-70.82045	Middleborough	Plympton	7.35
130	Federal Pond	41.87658	-70.70746	Carver/Plymouth	Plymouth/ Wareham	165.29
131	Unnamed pond in Cedar Swamp	41.88227	-70.73676	Carver	Plymouth	11.02
132	Clam Pudding Pond	41.87898	-70.58698	Plymouth	Manomet	14.69
133	Briggs Reservoir	41.87220	-70.56358	Plymouth	Sagamore	47.75
134	Unnamed pond in Cedar Swamp	41.87692	-70.75739	Carver	Plympton	11.02
135	Unnamed pond near Maxim Corner	41.87615	-70.81028	Middleborough	Plympton	11.02
137	Little Long and Long Ponds	41.86047	-70.60634	Plymouth	Sagamore	286.50
138	Ship Pond	41.86976	-70.53424	Plymouth	Sagamore	11.02
139	Unnamed pond near South Meadow Brook	41.87047	-70.77950	Carver	Snipatuit Pond	22.04
140	Morey Hole	41.86886	-70.55775	Plymouth	Sagamore	29.38

Table 1–1. Identifiers, names, locations, names of U.S. Geological Survey topographic quadrangles and modeled areas of ponds in the Plymouth-Carver aquifer, Sagamore, Monomoy, and Lower Cape aquifers.—Continued

[Pond identifiers are unique within each aquifer system. Datum is North American Datum 1983. MMR, Massachusetts Military Reservation]

Identifier	Pond name	Latitude (decimal degrees)	Longititude, (decimal degrees)	Town	Name of topographic quadrangle	Modeled area (acres)
			Plymouth–Carver Aquifer—Continued			
142	College Pond	41.86750	-70.66498	Plymouth	Wareham	55.10
144	Dunham Pond	41.86687	-70.73254	Carver	Wareham	47.75
145	Unnamed pond near Rocky Meadow Brook	41.86843	-70.80449	Carver	Snipatuit Pond	11.02
147	Gallows Pond	41.86273	-70.61512	Plymouth	Sagamore	51.42
148	Torrey Pond	41.86317	-70.67385	Plymouth	Wareham	18.37
149	Unnamed pond near Atwood Bogs	41.85945	-70.77228	Carver	Snipatuit Pond	286.50
150	Three Cornered Pond	41.85988	-70.67389	Plymouth	Wareham	33.06
151	Dugway Pond	41.85795	-70.56673	Plymouth	Sagamore	7.35
153	Halfway Pond	41.85288	-70.61819	Plymouth	Sagamore	227.73
154	Sampson Pond	41.85053	-70.75036	Carver	Snipatuit Pond/ Wareham	315.89
155	Unnamed pond near Crane Brook	41.85697	-70.72826	Carver	Wareham	7.35
156	Bloody Pond	41.84930	-70.58300	Plymouth	Sagamore	117.54
157	Unnamed pond near Tremont Street	41.85370	-70.73270	Carver	Wareham	36.73
158	Unnamed pond near Double Brook	41.85525	-70.80316	Middleborough	Snipatuit Pond	18.37
160	Round Pond	41.85277	-70.60498	Plymouth	Sagamore	29.38
161	New Long Pond	41.85113	-70.67841	Plymouth	Wareham	29.38
163	Unnamed pond near Atwood Bogs	41.85405	-70.78555	Carver	Snipatuit Pond	11.02
164	Bumps Pond	41.85209	-70.65931	Plymouth	Wareham	18.37
166	Savery Pond	41.84684	-70.55074	Plymouth	Sagamore	33.06
167	East Head Pond	41.84350	-70.68585	Carver/Plymouth	Wareham	128.56
168	Unnamed pond near Tremont Street	41.84604	-70.73573	Carver	Wareham	18.37
169	Barrett Pond	41.84465	-70.69317	Carver	Wareham	14.69
171	Bates Pond	41.83641	-70.77401	Carver	Snipatuit Pond	29.38
172	Cedar Pond	41.83505	-70.73439	Carver	Wareham	7.35
173	Unnamed reservoir	41.83426	-70.62432	Plymouth	Sagamore/Wareham	14.69
175	Little Herring Pond	41.82510	-70.57601	Plymouth	Sagamore	102.85
176	Fearing Pond	41.83129	-70.66692	Plymouth	Wareham	25.71
177	Unnamed pond near Huckleberry Corner	41.83196	-70.76525	Carver	Snipatuit Pond	7.35
178	Clear Pond	41.83181	-70.74177	Carver	Wareham	7.35

Table 1–1. Identifiers, names, locations, names of U.S. Geological Survey topographic quadrangles and modeled areas of ponds in the Plymouth-Carver aquifer, Sagamore, Monomoy, and Lower Cape aquifers.—Continued

[Pond identifiers are unique within each aquifer system. Datum is North American Datum 1983. MMR, Massachusetts Military Reservation]

Identifier	Pond name	Latitude (decimal degrees)	Longititude, (decimal degrees)	Town	Name of topographic quadrangle	Modeled area (acres)
			Plymouth–Carver Aquifer—Continued			
179	Black Jummy Pond	41.82944	-70.57008	Plymouth	Sagamore	11.02
180	Hedges Pond	41.82611	-70.56572	Plymouth	Sagamore	33.06
181	Fawn Pond	41.82667	-70.63616	Plymouth	Wareham	55.10
182	New Grassy Pond	41.82787	-70.65082	Plymouth	Wareham	7.35
183	Unnamed pond near Crane Brook	41.82750	-70.75503	Carver	Snipatuit Pond	7.35
184	Wall Pond	41.82530	-70.60096	Plymouth	Sagamore	11.02
185	Lang Duck Pond	41.82194	-70.59367	Plymouth	Sagamore	36.73
187	Big Rocky Pond	41.82088	-70.59809	Plymouth	Sagamore	18.37
188	Triangle Pond	41.81961	-70.57609	Plymouth	Sagamore	18.37
189	Deer Pond	41.82000	-70.62598	Plymouth	Wareham	7.35
190	Golden Field Pond	41.82073	-70.72723	Carver	Wareham	18.37
191	White Island Pond	41.81010	-70.62318	Plymouth/Wareham	Sagamore/Wareham	341.60
192	Abner Pond	41.81917	-70.66121	Plymouth	Wareham	7.35
193	Raccoon Pond	41.82068	-70.71989	Carver	Wareham	7.35
194	Unnamed pond near Crane Brook	41.81652	-70.75369	Carver	Snipatuit Pond/Wareham	95.50
196	Unnamed pond near Beach Street	41.81887	-70.77861	Middleborough	Snipatuit Pond	18.37
198	Charge Pond	41.81598	-70.67593	Plymouth	Wareham	22.04
199	Big Sandy Pond	41.81105	-70.60409	Plymouth	Sagamore	139.58
200	Island Pond	41.81084	-70.57769	Plymouth	Sagamore	62.44
201	Unnamed pond near Agawam River	41.81242	-70.63929	Plymouth	Wareham	40.40
202	Unnamed pond near Wareham Street	41.81425	-70.74345	Carver	Wareham	36.73
203	Great Herring Pond	41.79866	-70.56466	Plymouth/Bourne	Sagamore	451.79
204	Unnamed pond near Frogfoot Brook	41.80958	-70.70242	Plymouth	Wareham	29.38
205	Fivemile Pond	41.81253	-70.65396	Plymouth	Wareham	18.37
206	Unnamed pond near Wareham Street	41.81311	-70.73612	Carver	Wareham	14.69
209	Merton Pond	41.80658	-70.59389	Plymouth	Sagamore	11.02
210	Whites Pond	41.80555	-70.60270	Plymouth	Sagamore	36.73
211	Elbow Pond	41.80537	-70.58070	Plymouth	Sagamore	29.38
213	Ezekiel Pond	41.80453	-70.61299	Plymouth	Sagamore	40.40

Table 1–1. Identifiers, names, locations, names of U.S. Geological Survey topographic quadrangles and modeled areas of ponds in the Plymouth-Carver aquifer, Sagamore, Monomoy, and Lower Cape aquifers.—Continued

[Pond identifiers are unique within each aquifer system. Datum is North American Datum 1983. MMR, Massachusetts Military Reservation]

Identifier	Pond name	Latitude (decimal degrees)	Longititude, (decimal degrees)	Town	Name of topographic quadrangle	Modeled area (acres)
			Plymouth–Carver Aquifer—Continued			
214	Unnamed pond near Wareham Street	41.80436	-70.74063	Carver	Wareham	29.38
215	Little Long Pond	41.80491	-70.66287	Plymouth/Wareham	Wareham	18.37
217	Grassy Pond	41.80442	-70.59832	Plymouth	Sagamore	7.35
218	Unnamed pond near Hammond Street	41.80209	-70.73039	Carver	Wareham	14.69
220	Glen Charlie Pond	41.79163	-70.64837	Wareham	Wareham	202.02
223	Unnamed pond southeast of Little Long Pond	41.79938	-70.65707	Wareham	Wareham	25.71
224	Unnamed pond near Hammond Street	41.79991	-70.73188	Carver/Wareham	Wareham	36.73
225	Tihonet Pond	41.79212	-70.71731	Wareham	Wareham	117.54
226	Little Rocky Pond	41.79681	-70.60870	Plymouth	Sagamore	11.02
227	Little Sandy Pond	41.79568	-70.60431	Plymouth	Sagamore	33.06
229	Unnamed pond near Charge Pond Road	41.79632	-70.68938	Wareham	Wareham	7.35
230	Unnamed pond near Main Street	41.79354	-70.76570	Wareham	Snipatuit Pond	58.77
232	Bartlett Pond	41.79371	-70.63368	Wareham	Wareham	11.02
233	Unnamed pond near Charge Pond Road	41.79310	-70.69969	Wareham	Wareham	7.35
234	Unnamed pond near Charge Pond Road	41.79304	-70.69089	Wareham	Wareham	7.35
235	Unnamed pond near Charge Pond Road	41.79085	-70.69239	Wareham	Wareham	7.35
236	Mosquito Pond	41.79111	-70.72905	Wareham	Wareham	11.02
237	Unnamed pond near Charge Pond Road	41.78965	-70.67773	Wareham	Wareham	7.35
239	Unnamed pond west of Glen Charlie Pond	41.78622	-70.65871	Wareham	Wareham	7.35
240	Black Pond	41.78435	-70.56047	Bourne	Sagamore	7.35
241	Unnamed pond near Rose Brook	41.78347	-70.73648	Wareham	Wareham	14.69
242	Unnamed pond near Maple Swamp	41.78224	-70.71743	Wareham	Wareham	18.37
243	Unnamed pond near Maple Swamp	41.77891	-70.71160	Wareham	Wareham	14.69
244	Weeks Pond	41.77820	-70.61482	Plymouth	Sagamore	11.02
245	Mill and Spectacle Ponds	41.77309	-70.66475	Wareham	Wareham	253.44
246	Unnamed pond near Harlow Brook	41.77995	-70.70279	Wareham	Wareham	3.67
249	Unnamed pond near Harlow Brook	41.77886	-70.70427	Wareham	Wareham	3.67
251	Parker Mills Pond	41.77458	-70.72045	Bourne	Sagamore	80.81
252	Foundry Pond	41.77341	-70.56503	Bourne	Sagamore	7.35

Table 1–1. Identifiers, names, locations, names of U.S. Geological Survey topographic quadrangles and modeled areas of ponds in the Plymouth-Carver aquifer, Sagamore, Monomoy, and Lower Cape aquifers.—Continued

[Pond identifiers are unique within each aquifer system. Datum is North American Datum 1983. MMR, Massachusetts Military Reservation]

Identifier	Pond name	Latitude (decimal degrees)	Longititude, (decimal degrees)	Town	Name of topographic quadrangle	Modeled area (acres)
			Plymouth–Carver Aquifer—Continued			
253	Goat Pasture Pond	41.77259	-70.59877	Plymouth	Wareham/Sagamore	22.04
254	Mare Pond	41.77279	-70.62516	Plymouth	Sagamore	25.71
255	Unnamed pond south of Weeks Pond	41.77273	-70.61783	Wareham	Wareham	14.69
256	Sandy Pond	41.77193	-70.65597	Wareham	Wareham/Snipatuit Pond	29.38
259	Horseshoe Pond	41.76382	-70.75284	Wareham	Wareham	66.12
260	Cedar Pond	41.76539	-70.66338	Wareham	Wareham	14.69
262	Union Pond	41.76216	-70.67222	Wareham	Wareham	18.37
263	Dicks Pond	41.75986	-70.65759	Wareham	Wareham	47.75
264	Sand Pond	41.75977	-70.64586	Bourne	Sagamore	11.02
265	Queen Sewell Pond	41.75507	-70.60488	Wareham	Wareham	14.69
266	Blackmere Reservoir	41.75711	-70.73386	Bourne	Sagamore	11.02
267	Nightingale Pond	41.75498	-70.59315	Wareham	Wareham	7.35
268	Beaverdam Pond	41.75560	-70.67524	Wareham	Wareham	7.35
270	Unnamed pond near Brandy Hill	41.75022	-70.68997	Bourne	Pocasset	7.35
271	Bourne Pond	41.74846	-70.60204	Bourne	Pocasset	11.02
			Sagamore Aquifer			
3	Lower Shawme Lake	41.75393	-70.50154	Sandwich	Sagamore	29.38
4	Upper Shawme Lake	41.74734	-70.50164	Sandwich	Pocasset	25.71
5	Hoxie Pond	41.73246	-70.43446	Sandwich	Sandwich	11.02
6	Nye Pond	41.72696	-70.43308	Sandwich	Sandwich	7.35
7	Mill Pond	41.72837	-70.59572	Bourne	Pocasset	7.35
8	Clay Pond	41.71628	-70.59443	Bourne	Pocasset	7.35
10	Unnamed pond, West Barnstable	41.70895	-70.38651	Barnstable	Sandwich	22.04
11	Hinckley Pond	41.70502	-70.32358	Barnstable	Hyannis	11.02
12	Spectacle Pond	41.70304	-70.45839	Sandwich	Sandwich	88.15
13	Lawrence Pond	41.69960	-70.44233	Sandwich	Sandwich	132.23
14	Dennis Pond	41.69549	-70.25345	Barnstable	Hyannis	36.73
15	Miss Thacher's Pond	41.69620	-70.21828	Barnstable	Dennis	11.02
16	Greenough Pond	41.69422	-70.23736	Barnstable	Dennis	25.71

Table 1–1. Identifiers, names, locations, names of U.S. Geological Survey topographic quadrangles and modeled areas of ponds in the Plymouth-Carver aquifer, Sagamore, Monomoy, and Lower Cape aquifers.—Continued

[Pond identifiers are unique within each aquifer system. Datum is North American Datum 1983. MMR, Massachusetts Military Reservation]

Identifier	Pond name	Latitude (decimal degrees)	Longititude, (decimal degrees)	Town	Name of topographic quadrangle	Modeled area (acres)
			Sagamore Aquifer—Continued			
17	Elisha's Pond	41.69522	-70.22856	Barnstable	Dennis	11.02
18	Triangle Pond	41.69425	-70.45706	Sandwich	Sandwich	69.79
19	Garrett's Pond	41.69214	-70.35165	Barnstable	Hyannis	29.38
20	Peters Pond	41.68908	-70.49230	Sandwich	Sandwich	117.54
21	Flax Pond	41.68885	-70.59628	Bourne	Pocasset	22.04
22	Little Pond	41.68621	-70.41912	Barnstable	Sandwich	11.02
23	Hathaway Pond (north)	41.68405	-70.31225	Barnstable	Hyannis	18.37
24	Snake Pond	41.68274	-70.52022	Sandwich	Pocasset	77.13
25	Flax Pond	41.68266	-70.18634	Barnstable	Dennis	11.02
26	Israel Pond	41.68150	-70.27862	Barnstable	Hyannis	14.69
27	Mystic/Middle/Hamblin Pond	41.67408	-70.41347	Barnstable	Sandwich	374.66
28	Lamson Pond	41.68029	-70.26839	Barnstable	Hyannis	18.37
29	Hathaway Pond (south)	41.68078	-70.31524	Barnstable	Hyannis	14.69
30	Wequaquet Lake	41.67115	-70.33885	Barnstable	Hyannis	631.77
31	Pimlico Pond	41.67925	-70.49831	Sandwich	Sandwich	11.02
32	Weeks Pond	41.67948	-70.52466	Sandwich	Pocasset	14.69
33	Shallow Pond	41.67649	-70.32411	Barnstable	Hyannis	80.81
34	Mashpee/Wakeby Pond	41.67037	-70.48674	Mashpee	Sandwich	786.04
35	Mary Dunn Pond	41.67491	-70.27875	Barnstable	Hyannis	18.37
36	Red Brook Pond	41.67688	-70.60963	Bourne	Pocasset	14.69
38	Phlashes Pond	41.66989	-70.22174	Barnstable	Dennis	44.08
39	Long Pond	41.66963	-70.19832	Barnstable	Dennis	58.77
40	Schubael Pond	41.67170	-70.39447	Barnstable	Sandwich	62.44
41	Bassetts Lot Pond	41.66673	-70.23352	Barnstable	Dennis	7.35
42	Long Pond	41.66669	-70.44434	Barnstable	Sandwich	47.75
43	Horse Pond	41.66460	-70.23941	Barnstable	Dennis	25.71
44	Muddy Pond	41.66659	-70.43409	Barnstable	Sandwich	22.04
45	Little Sandy Pond	41.66362	-70.24968	Barnstable	Hyannis	11.02
46	Big Sandy Pond	41.66018	-70.23657	Barnstable	Dennis	11.02

Table 1–1. Identifiers, names, locations, names of U.S. Geological Survey topographic quadrangles and modeled areas of ponds in the Plymouth-Carver aquifer, Sagamore, Monomoy, and Lower Cape aquifers.—Continued

[Pond identifiers are unique within each aquifer system. Datum is North American Datum 1983. MMR, Massachusetts Military Reservation]

Identifier	Pond name	Latitude (decimal degrees)	Longititude, (decimal degrees)	Town	Name of topographic quadrangle	Modeled area (acres)
			Sagamore Aquifer—Continued			
47	Jabinettes Pond	41.65914	-70.24245	Barnstable	Dennis	7.35
49	Santuit Pond	41.65365	-70.45919	Mashpee	Cotuit	157.94
50	Long Pond	41.65575	-70.33620	Barnstable	Hyannis	44.08
51	Osborn Pond	41.65793	-70.57330	Bourne	Pocasset	14.69
52	Fawcetts Pond	41.64883	-70.30413	Barnstable	Hyannis	7.35
53	North Pond	41.65066	-70.37581	Barnstable	Cotuit	7.35
54	Lovells Pond	41.64800	-70.44172	Barnstable	Cotuit	51.42
55	West Pond	41.64738	-70.37733	Barnstable	Cotuit	11.02
56	Cedar Lake	41.64954	-70.62318	Bourne	Pocasset	14.69
57	Washburn Pond	41.64400	-70.48423	Barnstable	Cotuit	11.02
58	Simmons Pond	41.64008	-70.30722	Barnstable	Hyannis	11.02
59	Moody Pond	41.64095	-70.51208	Mashpee	Pocasset	25.71
60	Micah Pond	41.63862	-70.37895	Barnstable	Cotuit	14.69
61	Bog Pond	41.63772	-70.39945	Barnstable	Cotuit	7.35
62	Joshua Pond	41.63645	-70.38191	Barnstable	Cotuit	11.02
63	Ashumet Pond	41.63236	-70.53416	Mashpee	Pocasset	205.69
64	Eagle Pond	41.63469	-70.42731	Barnstable	Cotuit	7.35
65	Johns Pond	41.62785	-70.52106	Mashpee	Pocasset	326.91
67	Wings Pond	41.62652	-70.62642	Falmouth	Onset	25.71
68	Deep Pond	41.62395	-70.57964	Falmouth	Falmouth	29.38
69	Coonamessett Pond	41.61946	-70.56800	Falmouth	Falmouth	172.64
70	Grassy Pond	41.62249	-70.53577	Falmouth	Falmouth	7.35
71	Unnamed pond near Johns Pond	41.62123	-70.51677	Mashpee	Falmouth	11.02
72	Martha Pond	41.62009	-70.51240	Mashpee	Falmouth	11.02
73	Round Pond	41.61940	-70.56069	Falmouth	Falmouth	11.02
74	Crooked Pond	41.61740	-70.58412	Falmouth	Falmouth	36.73
75	Unnamed pond near Johns Pond	41.61462	-70.51395	Mashpee	Falmouth	7.35
76	Crocker Pond	41.61664	-70.62656	Falmouth	Woods Hole	7.35
77	Shallow Pond	41.60973	-70.58570	Falmouth	Falmouth	11.02

Table 1–1. Identifiers, names, locations, names of U.S. Geological Survey topographic quadrangles and modeled areas of ponds in the Plymouth-Carver aquifer, Sagamore, Monomoy, and Lower Cape aquifers.—Continued

[Pond identifiers are unique within each aquifer system. Datum is North American Datum 1983. MMR, Massachusetts Military Reservation]

Identifier	Pond name	Latitude (decimal degrees)	Longititude, (decimal degrees)	Town	Name of topographic quadrangle	Modeled area (acres)
			Sagamore Aquifer—Continued			
78	Round Pond	41.60089	-70.57851	Falmouth	Falmouth	22.04
79	Jenkins Pond	41.59656	-70.58588	Falmouth	Falmouth	88.15
80	Fresh Pond	41.59393	-70.53328	Falmouth	Falmouth	11.02
81	Unnamed pond along Coonamessett River	41.59535	-70.57274	Falmouth	Falmouth	14.69
82	Deer Pond	41.59554	-70.59613	Falmouth	Falmouth	11.02
84	Flax Pond	41.58873	-70.56845	Falmouth	Falmouth	18.37
85	Mares Pond	41.58788	-70.59917	Falmouth	Falmouth	29.38
86	Spectacle Pond	41.58783	-70.59332	Falmouth	Falmouth	18.37
87	Bourne Pond	41.58504	-70.52171	Falmouth	Falmouth	7.35
88	Long Pond	41.57923	-70.61537	Falmouth	Falmouth	143.25
89	Dean Pond	41.57028	-70.46639	Barnstable	Cotuit	11.02
90	Grews Pond	41.56933	-70.61405	Falmouth	Falmouth	14.69
91	Jones Pond	41.56159	-70.60684	Falmouth	Falmouth	11.02
92	Morse Pond	41.55719	-70.60544	Falmouth	Falmouth	11.02
93	Shivericks Pond	41.55399	-70.61718	Falmouth	Falmouth	7.35
94	Siders Pond	41.54854	-70.62164	Falmouth	Falmouth	33.06
95	Pond near MMR rotary	41.68549	-70.58754	Bourne	Pocasset	7.35
96	Edmunds Pond	41.65464	-70.57334	Bourne	Pocasset	11.02
98	Unnamed pond north of Shivericks Pond	41.55617	-70.61569	Falmouth	Falmouth	7.35
99	Jim Pond	41.56932	-70.48103	Mashpee	Cotuit	14.69
100	Unnamed pond near Quaker Meetinghouse Rd	41.74370	-70.46212	Sandwich	Sandwich	7.35
101	Hog Pond (North)	41.68651	-70.45133	Sandwich	Sandwich	7.35
102	Hog Pond (South)	41.68323	-70.45285	Sandwich	Sandwich	7.35
103	Pattys Pond	41.65786	-70.44009	Barnstable	Cotuit	7.35
104	Round Pond	41.66725	-70.38870	Barnstable	Sandwich	7.35
105	Lambert Pond	41.65946	-70.37712	Barnstable	Cotuit	14.69
107	Miller Pond	41.69867	-70.24314	Yarmouth	Dennis	7.35
108	Flintrock Pond	41.67828	-70.28600	Barnstable	Hyannis	7.35
109	Spruce Pond	41.69111	-70.35899	Barnstable	Hyannis	7.35
110	Sandy Hill Pond	41.69006	-70.36340	Barnstable	Hyannis	7.35

Table 1–1. Identifiers, names, locations, names of U.S. Geological Survey topographic quadrangles and modeled areas of ponds in the Plymouth-Carver aquifer, Sagamore, Monomoy, and Lower Cape aquifers.—Continued

[Pond identifiers are unique within each aquifer system. Datum is North American Datum 1983. MMR, Massachusetts Military Reservation]

Identifier	Pond name	Latitude (decimal degrees)	Longititude, (decimal degrees)	Town	Name of topographic quadrangle	Modeled area (acres)
			Monomoy Aquifer			
2	Cedar Pond	41.79445	-69.99186	Orleans	Orleans	14.69
3	Harvey Pond	41.77969	-69.95554	Orleans	Orleans	7.35
4	Crystal Lake	41.77457	-69.98353	Orleans	Orleans	36.73
5	Baker Pond	41.76606	-70.00426	Orleans	Harwich	29.38
6	Flax Pond	41.76635	-70.02625	Brewster	Harwich	47.75
7	Pilgrim Lake	41.76464	-69.97937	Orleans	Orleans	40.40
8	Blueberry and Salls Ponds	41.76449	-70.05269	Brewster	Harwich	29.38
9	Cobbs Pond	41.76603	-70.08785	Brewster	Harwich	18.37
10	Cliff and Little Cliff Ponds	41.75753	-70.02352	Brewster	Harwich	242.42
11	Higgins Pond	41.75734	-70.00886	Brewster	Harwich	25.71
12	Coles Pond	41.75674	-70.13644	Dennis	Dennis	14.69
13	School House Pond	41.75292	-70.09254	Brewster	Harwich	11.02
14	Ruth Pond	41.75216	-70.03244	Brewster	Harwich	11.02
15	Smith Pond	41.74757	-70.10438	Brewster	Harwich	11.02
16	Rafe Pond	41.74536	-70.01647	Brewster	Harwich	11.02
17	Sheep Pond	41.73837	-70.07087	Brewster	Harwich	143.25
18	Sarahs Pond	41.74151	-69.97405	Orleans	Chatham	7.35
19	Twinings Pond	41.74165	-69.98431	Orleans	Chatham	11.02
20	Griffiths Pond	41.74083	-70.09134	Brewster	Harwich	29.38
21	Lower Mill Pond	41.74106	-70.11039	Brewster	Harwich	44.08
22	Scargo Lake	41.74193	-70.18366	Dennis	Dennis	47.75
23	Shoal and Deep Ponds	41.73955	-69.99169	Orleans	Chatham	18.37
24	Uncle Seths Pond	41.73743	-69.99760	Orleans	Chatham	7.35
25	Canoe Pond	41.73679	-70.12074	Brewster	Harwich	11.02
26	Upper Mill Pond	41.73017	-70.11795	Brewster	Harwich	238.75
27	Long Pond	41.72511	-70.06384	Harwich	Harwich	841.14
28	Cedar Pond	41.73492	-70.14716	Dennis	Dennis	11.02
29	Seymour Pond	41.72438	-70.09316	Harwich	Harwich	183.65
30	Aunt Pattys Pond	41.72723	-70.14732	Dennis	Dennis	14.69

Table 1–1. Identifiers, names, locations, names of U.S. Geological Survey topographic quadrangles and modeled areas of ponds in the Plymouth-Carver aquifer, Sagamore, Monomoy, and Lower Cape aquifers.—Continued

[Pond identifiers are unique within each aquifer system. Datum is North American Datum 1983. MMR, Massachusetts Military Reservation]

Identifier	Pond name	Latitude (decimal degrees)	Longititude, (decimal degrees)	Town	Name of topographic quadrangle	Modeled area (acres)
			Monomoy Aquifer—Continued			
31	Walkers Pond	41.72260	-70.12691	Brewster	Dennis	99.17
32	Slough Pond	41.72376	-70.13274	Brewster	Dennis	25.71
33	Simmons Pond	41.72305	-70.16500	Dennis	Dennis	7.35
34	Pine Pond	41.72052	-70.13721	Brewster	Dennis	18.37
35	Bakers Pond	41.71953	-70.14602	Dennis	Dennis	14.69
36	Hinckleys Pond	41.71337	-70.09048	Harwich	Harwich	165.29
37	Hawksnest and Slack Ponds	41.71389	-70.04504	Harwich	Harwich	33.06
38	Grassy Pond	41.71643	-70.16220	Dennis	Dennis	22.04
39	Flax Pond	41.71562	-70.18713	Dennis	Dennis	14.69
40	Walkers Pond	41.71179	-70.05242	Harwich	Harwich	33.06
41	Elbow Pond	41.71380	-70.12563	Brewster	Harwich	36.73
42	Matthews Pond	41.70945	-70.22388	Yarmouth	Dennis	33.06
43	Aunt Edies Pond	41.70759	-70.06716	Harwich	Harwich	18.37
44	Unnamed pond, North Chatham	41.70507	-69.95881	Chatham	Chatham	7.35
45	Cornelius Pond	41.70640	-70.05986	Harwich	Harwich	11.02
46	Robbins Pond	41.70484	-70.11117	Harwich	Harwich	29.38
47	Stillwater Pond	41.70325	-69.98669	Chatham	Chatham	18.37
48	Josephs Pond	41.70078	-70.04974	Harwich	Harwich	22.04
49	White Pond	41.70291	-70.13319	Dennis	Dennis	11.02
50	Lovers Lake	41.69774	-69.98535	Chatham	Chatham	40.40
51	Bucks Pond	41.69961	-70.04390	Harwich	Harwich	33.06
52	Unnamed pond east of Bucks Pond	41.70061	-70.03656	Harwich	Harwich	7.35
53	Unnamed pond near Goose Pond	41.69904	-69.99997	Chatham	Harwich	14.69
54	Unnamed pond near Frost Frost Fish Creek	41.69641	-69.96781	Chatham	Chatham	14.69
55	Mill Pond	41.69828	-70.02636	Chatham	Harwich	25.71
56	Eagle Pond	41.69746	-70.13623	Dennis	Dennis	7.35
57	Goose Pond	41.69364	-70.00742	Chatham	Harwich	33.06
58	Schoolhouse Pond	41.69461	-69.99715	Chatham	Chatham	18.37
59	Emery Pond	41.69222	-69.98255	Chatham	Chatham	14.69

Table 1–1. Identifiers, names, locations, names of U.S. Geological Survey topographic quadrangles and modeled areas of ponds in the Plymouth-Carver aquifer, Sagamore, Monomoy, and Lower Cape aquifers.—Continued

[Pond identifiers are unique within each aquifer system. Datum is North American Datum 1983. MMR, Massachusetts Military Reservation]

Identifier	Pond name	Latitude (decimal degrees)	Longititude, (decimal degrees)	Town	Name of topographic quadrangle	Modeled area (acres)
			Monomoy Aquifer—Continued			
60	Flax Pond	41.69149	-70.09682	Harwich	Harwich	18.37
61	White Pond	41.68785	-69.98412	Chatham	Chatham	29.38
62	Perch Pond	41.68773	-69.97534	Chatham	Chatham	11.02
63	Sand Pond	41.68949	-70.11297	Harwich	Harwich	18.37
64	Reservoir	41.68406	-70.11748	Harwich	Harwich	88.15
65	Paddocks Pond	41.68227	-70.06187	Harwich	Harwich	14.69
66	Grass Pond	41.67916	-70.07659	Harwich	Harwich	18.37
67	Fresh Pond	41.67788	-70.15130	Dennis	Dennis	29.38
68	Skinequit Pond	41.67325	-70.04304	Harwich	Harwich	22.04
69	Run Pond	41.71878	-70.17534	Dennis	Dennis	7.35
70	Kelleys Pond	41.65951	-70.17657	Dennis	Dennis	33.06
71	Fund Pond	41.73281	-70.15453	Dennis	Dennis	7.35
72	Olivers Pond	41.71601	-70.03913	Harwich	Harwich	11.02
73	Andrews Pond	41.69787	-70.08056	Harwich	Harwich	7.35
			Lower Cape Aquifer			
3	Unnamed pond near Great Pond	42.06732	-70.19553	Provincetown	Provincetown	7.35
4	Great Pond	42.06498	-70.20052	Provincetown	Provincetown	14.69
5	Bennett Pond	42.05917	-70.19909	Provincetown	Provincetown	11.02
6	Duck Pond	42.05638	-70.19674	Provincetown	Provincetown	7.35
7	Clapps Pond	42.05298	-70.20954	Provincetown	Provincetown	47.75
8	Shank Painter Pond (west)	42.04916	-70.20109	Provincetown	Provincetown	25.71
9	Shank Painter Pond (east)	42.04775	-70.20687	Provincetown	Provincetown	18.37
10	Featherbed Swamp	41.97833	-70.02001	Truro	Wellfleet	7.35
11	Great Pond	41.97460	-70.03077	Truro	Wellfleet	36.73
12	Unnamed pond north of Round Pond	41.97321	-70.00878	Truro	Wellfleet	3.67
13	Round Pond	41.96960	-70.01097	Truro	Wellfleet	7.35
14	Horseleech Pond	41.96855	-70.00489	Truro	Wellfleet	33.06
15	Snow Pond	41.96937	-70.02812	Truro	Wellfleet	7.35
16	Gull Pond	41.95645	-70.00863	Wellfleet	Wellfleet	113.87

Table 1–1. Identifiers, names, locations, names of U.S. Geological Survey topographic quadrangles and modeled areas of ponds in the Plymouth-Carver aquifer, Sagamore, Monomoy, and Lower Cape aquifers.—Continued

[Pond identifiers are unique within each aquifer system. Datum is North American Datum 1983. MMR, Massachusetts Military Reservation]

Identifier	Pond name	Latitude (decimal degrees)	Longititude, (decimal degrees)	Town	Name of topographic quadrangle	Modeled area (acres)
			Lower Cape Aquifer—Continued			
17	Ryder Pond	41.96669	-70.03108	Truro	Wellfleet	22.04
18	Long Pond	41.94423	-70.00707	Wellfleet	Wellfleet	44.08
19	Great Pond	41.93981	-69.99991	Wellfleet	Wellfleet	58.77
20	Dyer Pond	41.93760	-70.01019	Wellfleet	Wellfleet	14.69
21	Duck Pond	41.93190	-70.00022	Wellfleet	Wellfleet	7.35
22	Unnamed pond northeast of Minister Pond	41.84998	-69.98717	Eastham	Orleans	3.67
23	Unnamed pond northeast of Minister Pond	41.84544	-69.98858	Eastham	Orleans	7.35
24	Minister Pond	41.84125	-69.97815	Eastham	Orleans	33.06
25	Great Pond	41.83299	-69.99029	Eastham	Orleans	117.54
26	Depot Pond	41.83217	-69.98096	Eastham	Orleans	33.06
27	Unnamed pond west of Great Pond	41.83102	-69.99729	Eastham	Orleans	3.67
28	Jemima Pond	41.82892	-69.98516	Eastham	Orleans	7.35
29	Widow Harding Pond	41.82880	-69.99372	Eastham	Orleans	7.35
30	Mill Pond	41.82601	-69.97754	Eastham	Orleans	18.37
31	Herring Pond	41.82531	-69.98734	Eastham	Orleans	40.40
32	Unnamed pond south of Mill Pond	41.81530	-69.97553	Eastham	Orleans	11.02
33	Higgins Pond	41.96134	-70.00925	Wellfleet	Wellfleet	33.06
34	Williams Pond	41.96436	-70.00832	Wellfleet	Wellfleet	14.69
35	Herring Pond	41.96297	-70.01409	Wellfleet	Wellfleet	25.71
36	Slough Pond	41.96715	-70.01066	Truro	Wellfleet	33.06

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