V. SITE AND FACILITY DESCRIPTIONS

Boston University Corporate Education Center
Tyngsborough, MA
Latitude: 42°39'12.26"N
Longitude: 71°24'19.71"W

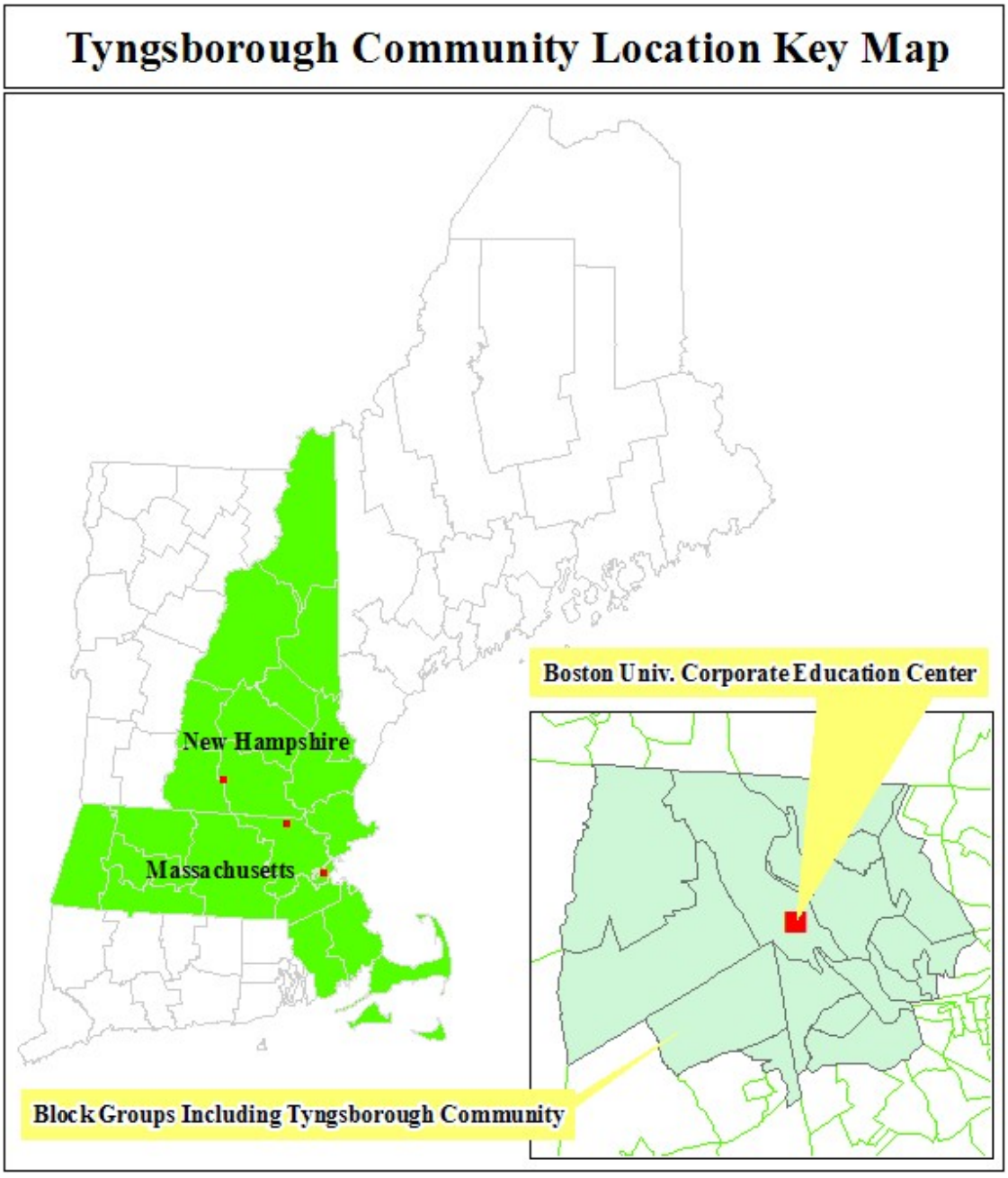

Figure IV-1. Tyngsborough community location key map.

Location and Site Description

The Town of Tyngsborough is a small residential community located in the northwest section of Middlesex County, in northeastern Massachusetts. Composed of 17.86 square miles of land and surface water, bordering towns include Dunstable and Groton on the west and northwest; Westford and Chelmsford on the south; Dracut and Lowell on the east; as well as Nashua and Hudson, New Hampshire on the north. The town is bisected by the Merrimack River. Tyngsborough is about 7 miles west of Lowell, 31 miles northwest of Boston, 26 miles northeast of Fitchburg, and 235 miles from New York City. Tyngsborough is dotted with numerous streams, lakes, great ponds, and wetlands. Long recognized as the “gateway” to the White Mountains and located thirty minutes from Boston along the Route 3 corridor, Tyngsborough enjoys a strategic position in the Merrimack Valley.

Tyngsborough was founded in 1675 by Colonel Jonathan Tyng and the historic Tyng Mansion House was one of the oldest homes north of Boston. During the founding period, settlers of Tyngsborough fought a series of small, but often bloody skirmishes with local Indian tribes, several colonial era homes in town still have emergency passage ways used during attacks. On February 23, 1809, Tyngsborough was incorporated as a town, breaking from Chelmsford, Dunstable, and the parishes in Billerica. As the town grew, Tyngsborough became known for its ferries, quarries, and box companies. Until the late 1960's, Tyngsborough was a vacation community with a large seasonal population. Today, Tyngsborough is a growing community of over 10,000 residents. A new Junior Senior High School, a new Police Station, and a progressive capital plan epitomize the community's desire to deliver the services of a larger community. During the past three years Tyngsborough has experienced a tremendous burst in residential construction but has retained the characteristics of a small rural community. Land usage is depicted in the following figure based on interpretation of 1999 1:25,000 color infrared photography.

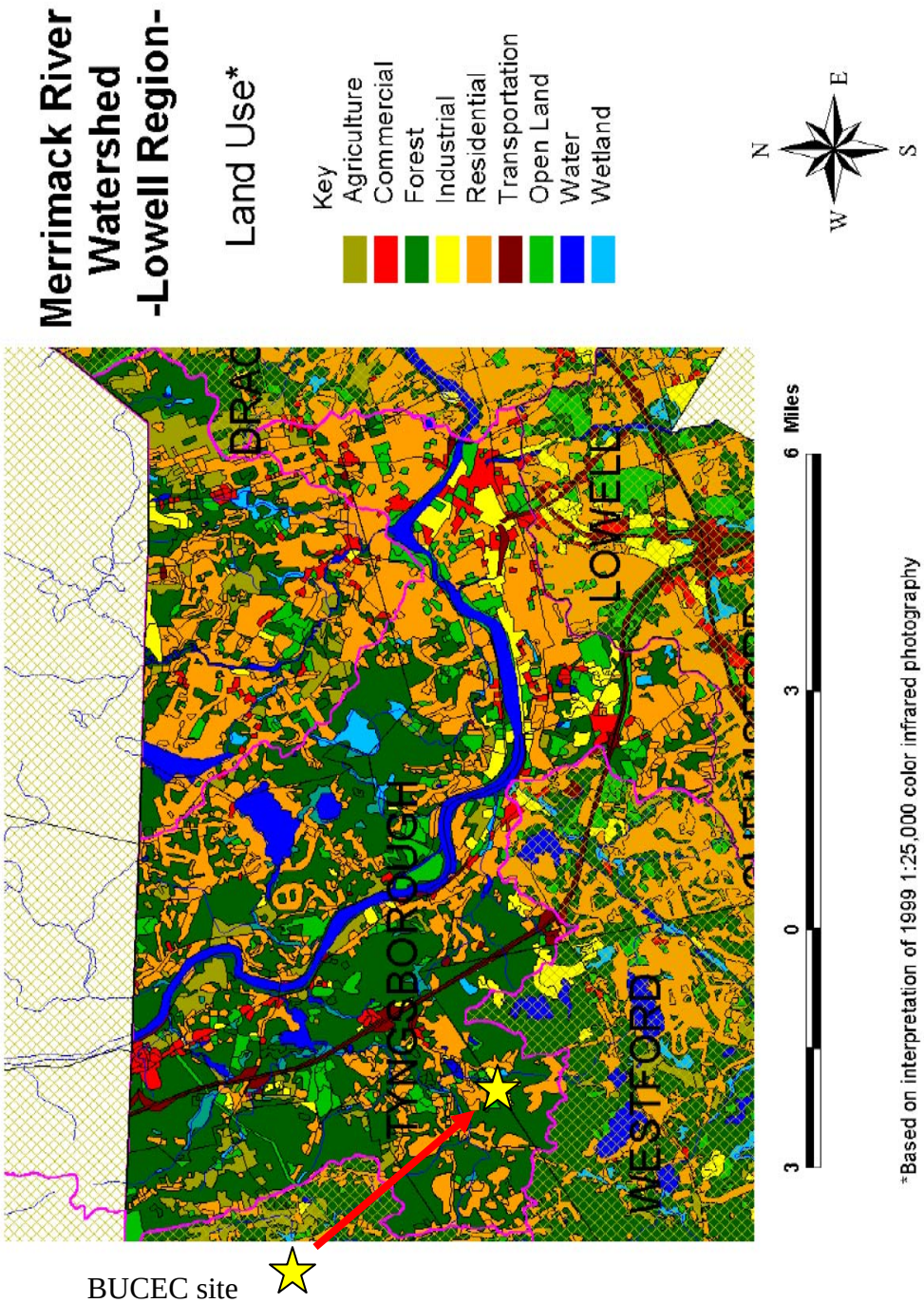

Figure IV-2. Merrimack River Watershed Land Use Map.

BUCEC site

Source: Merrimack River Five Year Watershed Action Plan. Massachusetts EOEA, DEP
www.mass.gov/envir/water/publications/WAPs/Merrimack_WAP_2002.pdf

Figure IV-3. Tyngsborough in relation to the Rt. 3 Corridor

Figure IV-4. Intersection Tyng Rd and 3A looking SE

Figure IV-5. Intersection Tyng Rd and 3A looking NW

A build-out analysis was completed for Tyngsborough by the Northern Middlesex Council of Governments (NMCOG) which showed various impacts of development if all the developable land in town were used, as currently allowed under existing zoning bylaws. These data are compared, below, with impacts of following the Master Plan recommendations and action program.

Table IV-1. Tyngsborough Build Out Analysis

Category	Build-out	Master Plan
Additional Residents	5,166	4,838
Total Population	16,247	15,919
Additional Residential units	1,700	15,919
Additional Comm./Ind. Floor Area	14,108,838 sf	497,100sf
Additional Residential Water Demand	387,505 gpd	362,850 gpd
Additional Comm./Industrial Water Demand	1,058,163 gpd	27,231 gpd
Additional School Students	799	744
Additional Roads	38.1 miles	35.5 miles
Additional Solid Waste - Recyclable	1,885 tons/yr	1,754 ton/year
Additional Solid Waste – Non-recyclable	766 tons/year	713 tons/yr

Source: Master Plan for Tyngsborough, Massachusetts
http://www.tyngsboroughmass.com/Master_Plan/4-16-04%20Plan%20Redraft.pdf

At foreseeable rates of development, residential build-out could occur between the years 2010 and 2015. The Master Plan has a significantly lower level of commercial and industrial development than the build-out analysis, principally because there is now a substantial amount of land zoned for commercial and industrial uses that is not likely to be developed.

Boston University Corporate Education Center (BUCEC), formerly the Wang Institute for Graduate Studies, is located on a 210 acre, forested site overlooking a private pond the majority of which is located Tyngsborough, Massachusetts. The site contains a mix of pine and mixed hardwood forests (see pictures). Several old, abandoned quarries are found within the borders of the property. The site is bordered by residential areas on all sides except for the southeast property line which is bordered by fields. The property is in the Merrimack River watershed and all storm and groundwater is carried to this water body. Stormwater from the site runs into a small brook on site that flows into the Merrimack River.

The existing BUCEC is a 88,000 sq. ft. facility consisting of classrooms, conference and meeting rooms, an auditorium, amphitheaters and dining facilities with associated

administrative areas. A residence and a Quonset hut are also present on the site. The BUCEC specializes in professional development courses in business process management; leadership, management and communications, project management and business analysis, geographical information systems, information technology; and a variety of professional development certificate programs in these areas. BUCEC also offers Master's level programs in Project Management.

A 330,000 square foot lot area (approximately 7.6 acres) is required for the proposed research facility. The Tyngsborough site has a lot size of over 200 acres. The site contains two wetland areas and a building listed in the National Register of Historic Places. Additionally, the town has identified much of the site as an Open Space Opportunity zone, through which they hope to create an open space corridor. Of the remaining site, the southeast corner is the best potential spot for the facility, due to its level topography and proximity to the site entrance. See the following figure for site proximities.

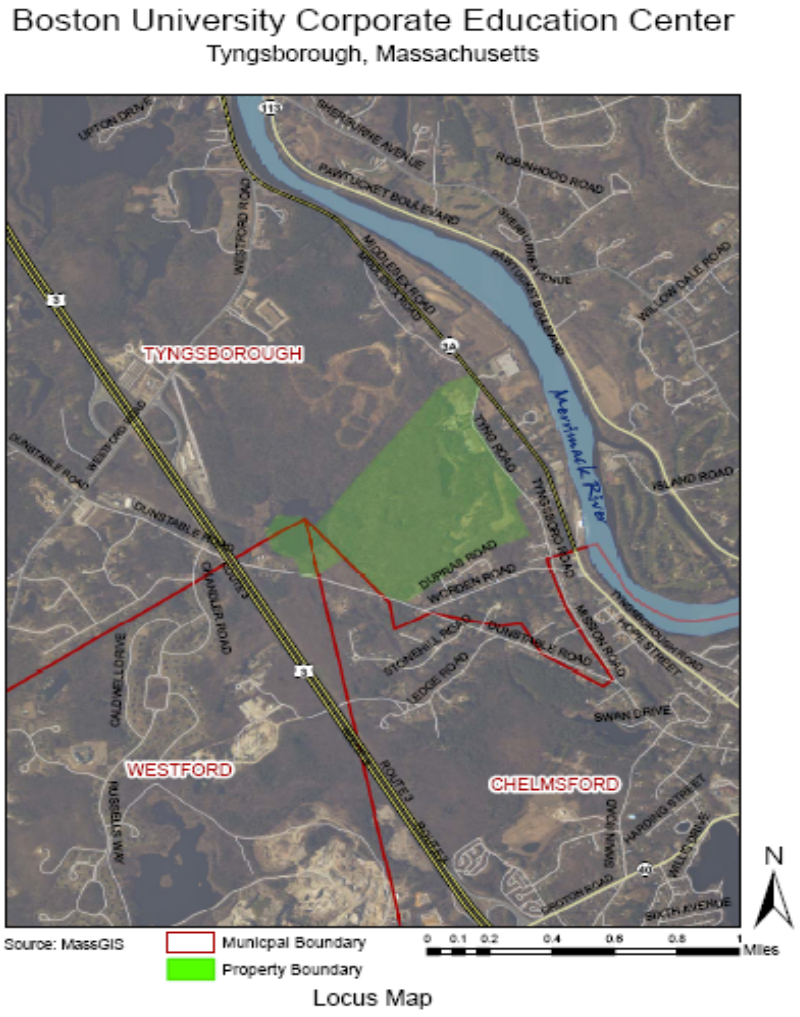

Figure IV-6. Boston University Corporate Education Center site map.

Visual Quality

The BUCEC site is heavily forested. The community immediately adjacent to the BUCEC is predominantly residential but Tyngsborough and surrounding areas are also agricultural in nature with livestock (cattle, sheep and horses), dairy farms and stables within a three mile radius. The BUCEC property is approximately 0.2 mile from the scenic Merrimack River and designated in the Tyngsborough Master Plan as falling within the village node. Forests on hills can prevent erosion and runoff problems.

Figure IV-7. Boston University Corporate Education Center

Figure IV-8. The BU Corporate Education Center on the site of the historic Tyng Mansion.

Figure IV-9. Grounds of the BU Corporate Education Center

Figure IV-10. Grounds of the BU Corporate Education Center

Figure IV-11. Grounds of the BU Corporate Education Center

Figure IV-12. Grounds of the BU Corporate Education Center

Figure IV-13. Adjacent Residential Community on Tyng Road

Figure IV-14. Adjacent Residential Community on Tyng Road

Figure IV-15. Surrounding Agricultural Community

Figure IV-15. Surrounding Agricultural Community

Historic Resources

Tyngsborough has a rich history and an active set of cultural resources that contribute much to the life of the community and its sense of place. There are great historic resources within the town that offer residents and visitors opportunities to learn about their heritage and the history of the town.; however there is a relatively incomplete inventory of the town's historic resources. There is one structure in Tyngsborough listed on the National Register of Historic Places, the Col. Jonathan Tyng House (added 1977 - Building - #77000188) also known as Tyng Mansion at 80 Tyng Rd., on the BUCEC site. This structure was destroyed by fire in 1981 and only foundation and some brick walls remain.

There are no historic districts in the town. There are at least two areas that may qualify for designation as historic districts—Tyngsborough Center and the James Butterfield House and Mill Area. The town's Master Plan recognizes the need for design review in areas that may qualify as historic districts and recommends the establishment of guidelines governing conservation of the historic buildings and requiring design of new buildings that complement the area's historic architecture.

Noise

The Town of Tyngsborough regulates noise within the town limits through the Zoning By-Laws (Town of Tyngsborough Zoning By-Law, Revision B, 24 June 2003). No noise is permitted within the Town of Tyngsborough which, would cause nuisance or hazard to persons or property. Exemptions from this town ordinance are vehicles that are not controlled by an owner or occupant of property within the Town; temporary construction activities occurring during the hours of 7 A.M. to 6 P.M. on weekdays; occasionally used safety signals, warning devices, emergency pressure relief valves, or other such temporary activity; and the use of power tools and equipment such as lawn mowers, snow-blowers, chain saws, tractors, and similar equipment for the maintenance of property. For the purposes of this By-law, the standards in Table IV-2 apply:

Table IV-2. Maximum Permitted Sound Levels For Sounds Generated Continuously From Any Source Not Otherwise Exempted.

Source	Sound Levels (dBA)
At the lot line of an adjacent or nearby residence or institutional use, weekdays during the hours of 7 a.m. to 6 p.m.	60
At the lot line of an adjacent or nearby residence or institutional use, weekdays during the hours of 6 p.m. to 7 a.m. weekdays	50
At the lot line of an adjacent Business Use	65
At the lot line of an adjacent Industrial Use	70

There are exceptions for intermittent noise. The levels (dBA) specified in the Table above may be exceeded by 10 dBA for 20 minutes per weekday during the hours of 7 A.M. to 6 P.M., but not at any other time. Impact noise such as from a punch press, drop forge hammer, or similar equipment, cannot not exceed the levels specified in the above Table by more than 10 dBA.

Utilities

Electric power for the BUCEC in Tyngsborough is supplied by the Massachusetts Electric Power Company. Electric power for chillers is on the grid that supplies the town. Heat is provided by natural gas-fired boilers supplied by the town utility. The site is supplied by the municipal water system and sewage is disposed of through an on-site sanitary disposal system with a leaching field that was installed 10 years ago. Municipal water service is available at the site. Municipal sewer service is not available from the town of Tyngsborough. It may be possible to tie into municipal sewer service from the adjacent town of Chelmsford approximately 200 yards away. Water for fire suppression is obtained from a fire pond on the property.

Tyngsborough and several other communities draw water from areas along the Merrimack River. Approximate 60% of the town is served by public water (this includes the BUCEC site). Tyngsborough can draw water from 14 DEP-permitted community wells. A community well serves at least 15 connections. A non-community water supply serves 25 or more persons at one location such as a school, factory or restaurant. Dracut also has five wells in Tyngsborough off of Frost Street. Interim Wellhead Protection areas are intended to protect water supplies. A radius based on the flow rate of the well defines these areas. Certain land uses may be either prohibited or restricted in these areas (see 310 CMR 22.00 the Massachusetts Drinking Water Regulations).

It is anticipated that a new facility would be able to tie into existing electrical and natural gas lines. There is not an expected impact from this activity. The site currently does not have a wastewater connection and cannot support a laboratory with a substantial, industrial wastewater output. A line would need to be added to tie into the adjacent town of Chelmsford at a significant cost. This wastewater treatment plant would need to be able to handle the estimated 258,852 gallons/day that may be generated at the new facility. It is estimated that the city would need to supply an additional 287,200 gallons/day of public drinking water to this facility. Supplying water for continued growth of the area is a concern for the community.

Transportation and Access

The development of transportation resources in the Merrimack River Valley, where Tyngsborough is situated, was shaped by the history of the region as a major site of American industrial development in the nineteenth century. The area has highway and rail facilities linking major cities and towns to each other and to the port, airport, and intermodal facilities of Boston. Principal highways are U.S. Route 3 running North-South between Nashua, New Hampshire and the Boston region, and State Route 113. Tyng Road, the main access road to the property is a collector street/quiet residential road with limited traffic. It is a country road with no lines and no shoulder (See Figures IV-16, 17).

The existing road infrastructure may not be ideal for the types and volume of construction, operational, and service related traffic that would be required to construct the building and then operate it. The impact would be a higher volume of construction traffic on this unlined road. Changes may need to be made to Tyng Road to handle this traffic, and also the extent to which the intersection of Tyng Rd and 3A may need to be upgraded. This would change the character of these local roads for area residents and add an increase in traffic on these roads.

Figure IV-16. Tyng Road at the entrance to the BUCEC.

Figure IV-17. Tyng Road at the entrance to the BUCEC.

Commuter rail service to North Station, Boston, is available from neighboring Lowell. Travel time is 45-49 min. and 680 Metropolitan Boston Transportation Authority (MBTA) parking spaces are available. Freight rail service is available from the Springfield Terminal Railway.

Tyngsborough is a member of the Lowell Regional Transit Authority (LRTA), which provides fixed bus service between Lowell and Tyngsborough. Paratransit services for the elderly and disabled are available through the Tyngsborough Council on Aging.

The Tew-Mac Airport, a General Aviation (GA) facility has 2 asphalt runways (600'x 60' and 2,830'x 26'). Non-precision instrument approaches are permitted. Other nearby airports include the Lawrence Municipal Airport in North Andover and L.G. Hanscom Field in Bedford. The region is served by Logan International Airport for most commercial and general aviation needs and the primary airport that would service the NEIDL should it be sited at BUCEC.

There are no direct mass transportation opportunities directly to the site. It is anticipated that most employees would arrive via personally owned vehicles.

Figure IV-18. Roads Surrounding BUCEC

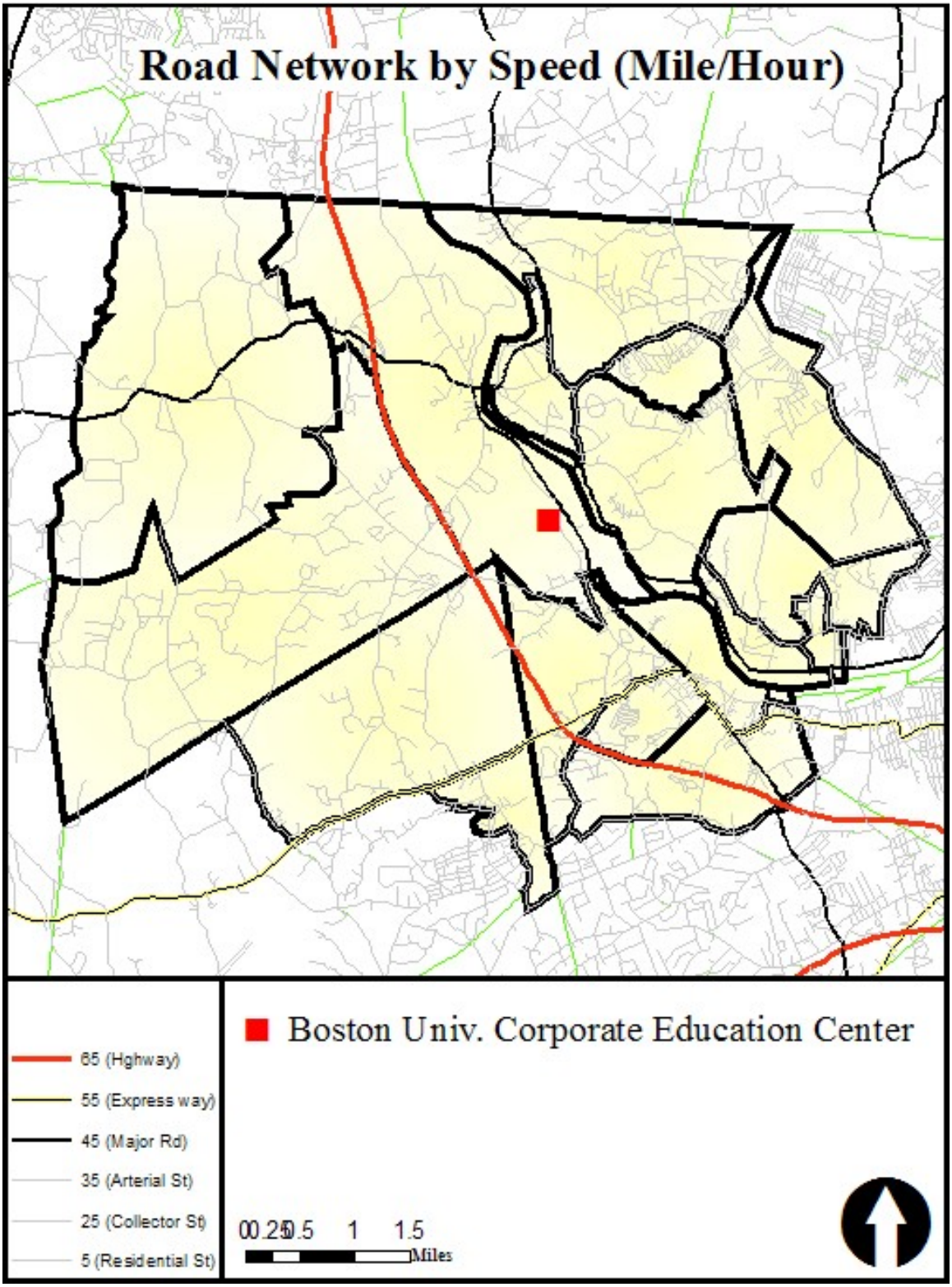

Figure IV-19. Roads Network Surrounding BUCEC

Air Quality

Tyngsborough is a town located in the northwest section of Middlesex County, Massachusetts. Composed of 17.86 square miles of land and surface water, Tyngsborough borders the towns of Dunstable, Groton, Westford, Chelmsford, Dracut, and the City of Lowell, as well as the New Hampshire communities of Hudson, Pelham, and the City of Nashua. Tyngsborough is approximately 30 miles from Boston along the recently widened Route 3 corridor.

The air quality impacts associated with the project would be similar to those seen in Boston due to the relative proximity between the two cities

Economics, Income and Demographics

The median household income range within the block group (BG) containing the BUCEC is $38,202-$45,633. Median family income range is $75,448-$77,844. Only a small number of individuals within this BG have incomes that fall below the poverty line. Detailed Information on 'How the Census Bureau Measures Poverty' can be found at http://www.census.gov/hhes/poverty/povdef.html .

As of the census of 2000, there were 11,081 people, 3,731 households, and 2,947 families residing in the town of Tyngsborough. The population density was 253.8/km² (657.4/mi²). There were 3,806 housing units at an average density of 87.2/km² (225.8/mi²). The racial makeup of the town was 95.63% White, 0.50% African American, 0.23% Native American, 2.48% Asian, 0.04% Pacific Islander, 0.14% from other races, and 0.99% from two or more races. Hispanic or Latino of any race were 1.11% of the population.

There were 3,731 households out of which 44.6% had children under the age of 18 living with them, 67.5% were married couples living together, 8.5% had a female householder with no husband present, and 21.0% were non-families. 16.1% of all households were made up of individuals and 4.9% had someone living alone who was 65 years of age or older. The average household size was 2.97 and the average family size was 3.37.

In the town the population was spread out with 30.3% under the age of 18, 5.7% from 18 to 24, 35.7% from 25 to 44, 21.6% from 45 to 64, and 6.6% who were 65 years of age or older. The median age was 35 years. For every 100 females there were 97.5 males. For every 100 females age 18 and over, there were 94.5 males.

The median income for a household in the town was $69,818, and the median income for a family was $78,680. Males had a median income of $46,942 versus $33,396 for females. The per capita income for the town was $27,249. About 4.0% of families and 4.7% of the population were below the poverty line, including 6.2% of those under age 18 and 5.6% of those aged 65 or over. One hundred and two (102) men in this BG have a

college education (Bachelor's Degree or higher). No women residing in this BG have completed a 4 year college degree.

Table IV-3. Profile of Selected Economic Characteristics for Tyngsborough for the year 2000.

Subject	Number	Percent
Workers 16 years and over 2000	5,863	100.0%
Commuting to Work in 2000		
Car, truck or van - drove alone	5,218	89.0%
Car, truck or van - carpooled	407	6.9%
Public transportation (including taxicab)	45	0.8%
Walked	20	0.3%
Other means	31	0.5%
Worked at home	142	2.4%
Mean travel time to work (minutes)	31.2	
Number of Households: 1989	2,823	100.0%
Number of Households: 1999	3,741	100.0%
Household Income in 1999		
Less than $10,000	120	3.2%
$10,000 to $14,999	187	5.0%
$15,000 to $24,999	189	5.1%
$25,000 to $34,999	194	5.2%
$35,000 to $49,000	589	15.7%
$50,000 to $74,999	724	19.4%
$75,000 to $99,999	859	23.0%
$100,000 to $149,000	580	15.5%
$150,000 to $199,999	169	4.5%
$200,000 or more	130	3.5%
Median household income	$69,818	
With earnings	3,407	91.1%

Subject	Number	Percent
Mean earnings (dollars)	$80,781	
With Social Security income	584	15.6%
Mean Social Security income (dollars)	$10,854	
With Supplemental Security Income	115	3.1%
Mean Supplemental Security Income (dollars)	$6,915	
With public assistance income	70	1.9%
Mean Public assistance income (dollars)	$3,020	
With retirement income	489	13.1%
Mean retirement income (dollars)	12,472	
Families	2,961	100.0%
Family Income: 1999		
Less than $10,000	62	2.1%
$10,000 to $14,999	63	2.1%
$15,000 to $24,999	132	4.5%
$25,000 to $34,999	129	4.4%
$35,000 to $49,999	414	14.0%
$50,000 to $74,999	551	18.6%
$75,000 to $99,999	806	27.2%
$100,000 to $149,999	538	18.2%
$150,000 to $199,999	160	5.4%
$200,000 or more	106	3.6%
Median Family Income (dollars)	$78,680	
Per Capita Income (dollars)	$27,249	
Median Earnings (dollars)		
Male, full-time, year round workers	$46,942	
Female, full-time, year round workers	$33,396	

Subject	# Below Poverty Level	% Below Poverty Level
Poverty Status in 1999		
Families	118	4.0%
With related children under 18 years	110	6.3%
With related children under 5 years	31	4.1%
Families with female householder, no husband present	38	13.8%
With related children under 18 years	38	20.4%
With related children under 5 years	0	0.0%
Individuals	519	4.7%
18 years and over	313	4.0%
65 years and over	39	5.6%
Related children under 18 years	206	6.2%
Related children 5 to 17 years	175	7.4%
Unrelated individuals 15 years and over	95	8.0%

Source: U.S. Bureau of the Census, Census 2000

Figures IV-20 through 22 illustrate the distribution of median incomes across the Block Groups in the area of interest and the distribution of those individuals whose income is below the poverty line.

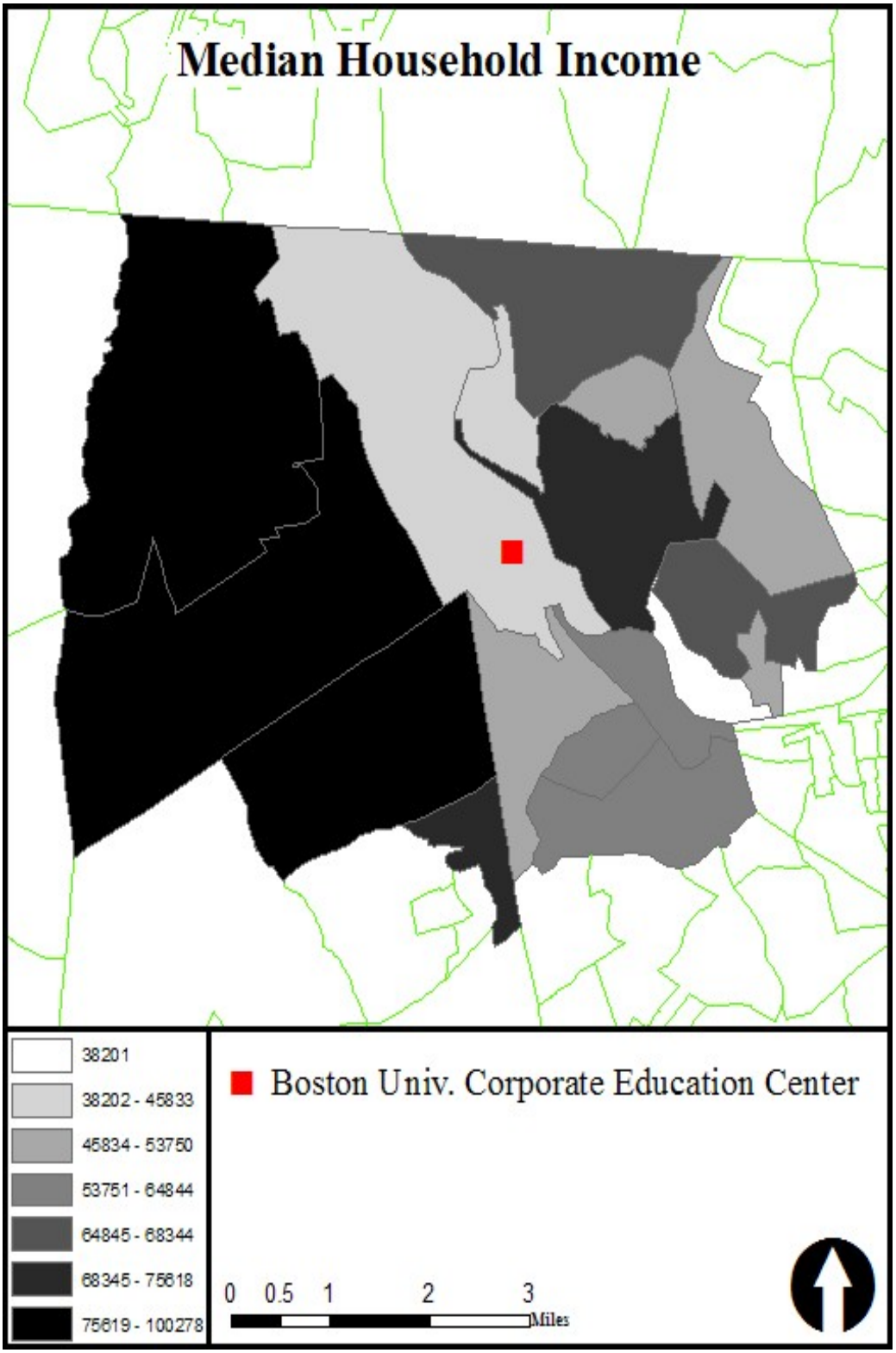

Figure IV-20. Distribution of Median Household Income in Tyngsborough, MA.

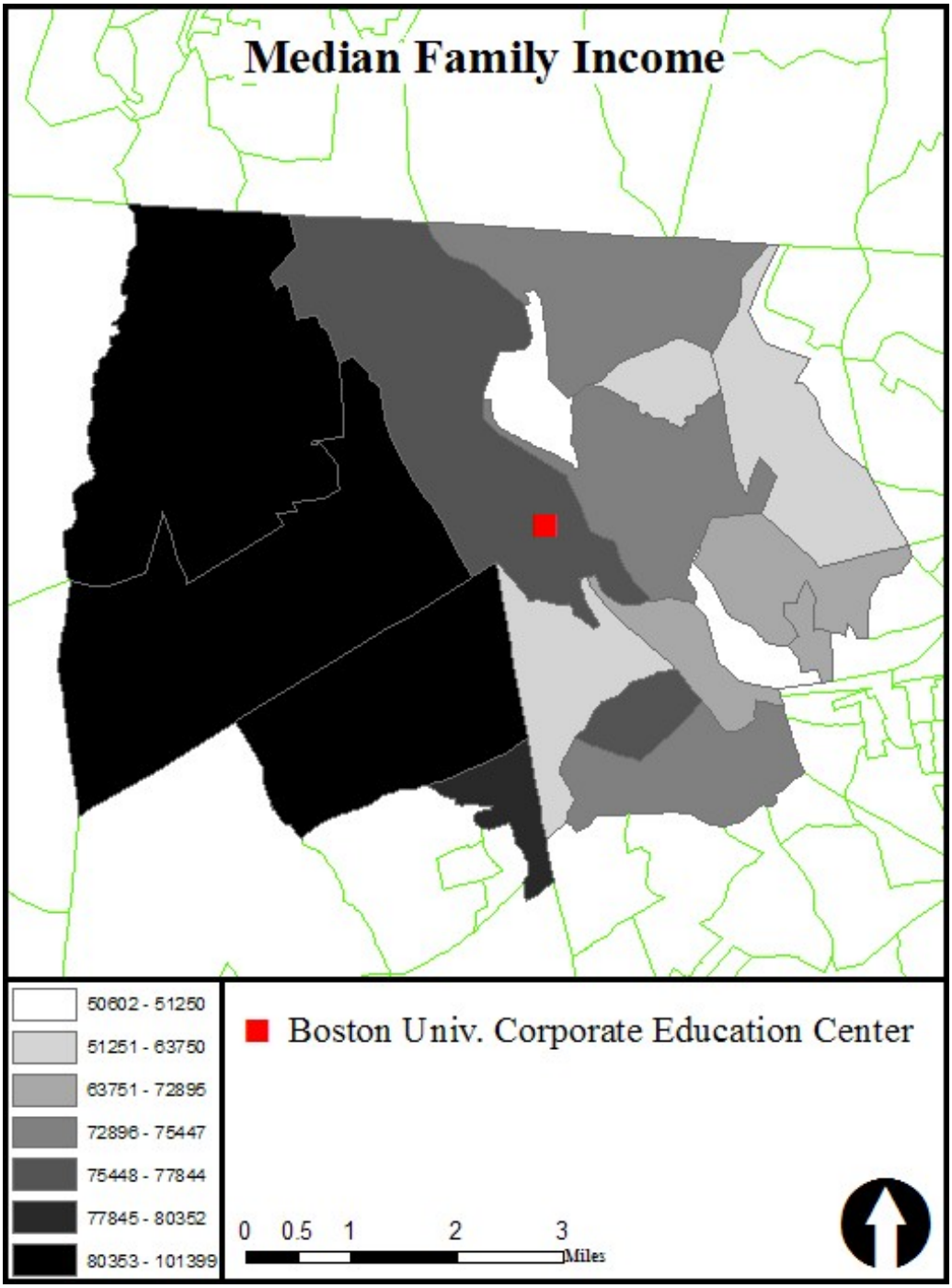

Figure IV-21. Distribution of Median Family Income in Tyngsborough, MA.

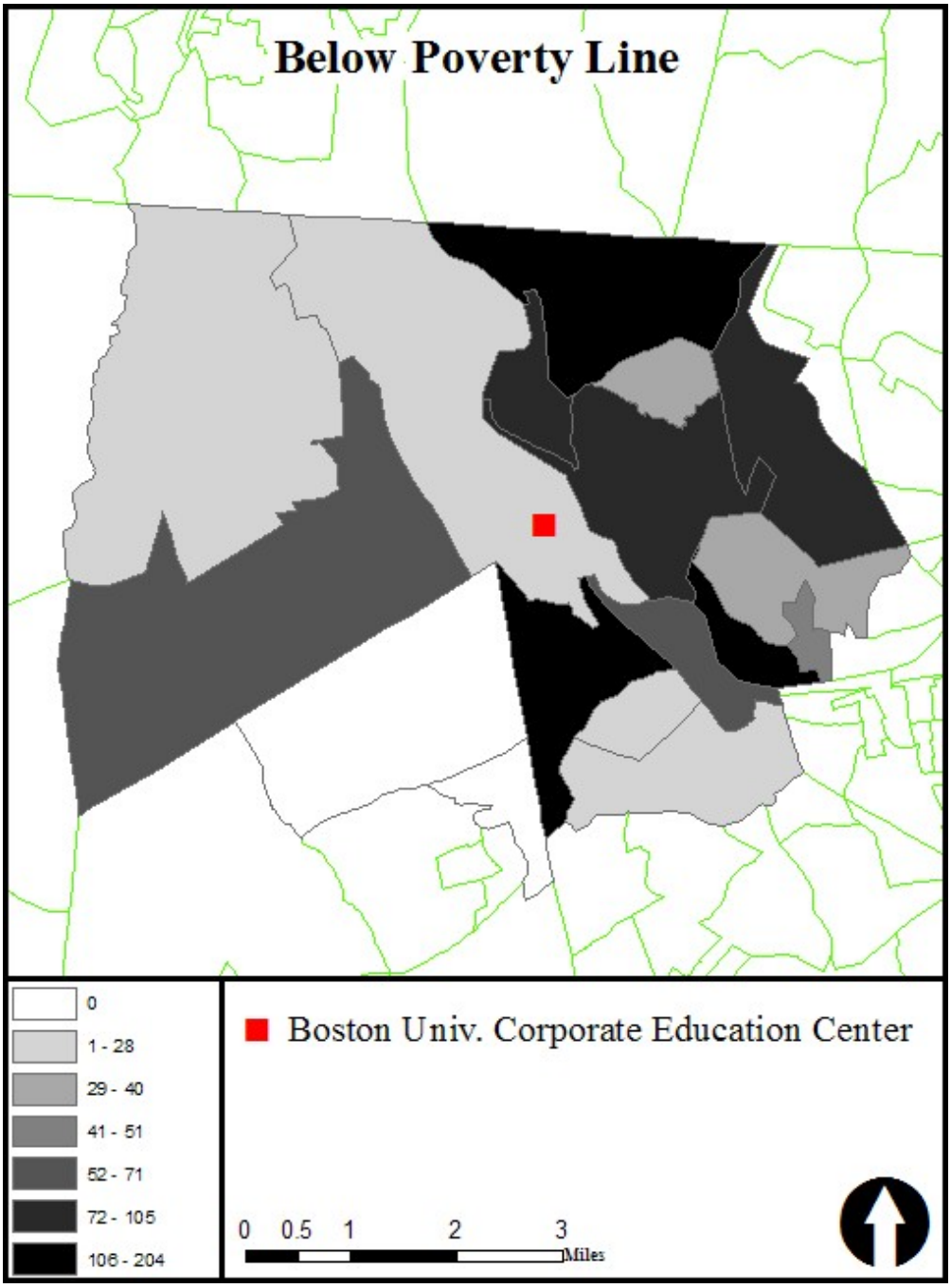

Figure IV-21. Distribution of individuals living below the poverty line in Tyngsborough, MA.

The population for the BGs in which the BUCEC is located is 1332. No Blacks, Asians or Hispanics reside in this BG; 59 individuals who identify themselves as being of mixed race reside in the BG where BUCEC is located. See the following maps illustrating the distribution of the population by race across the BGs. None of the BGs in this area of consideration qualify for an environmental justice determination based on either race, income or by virtue of being foreign-born.

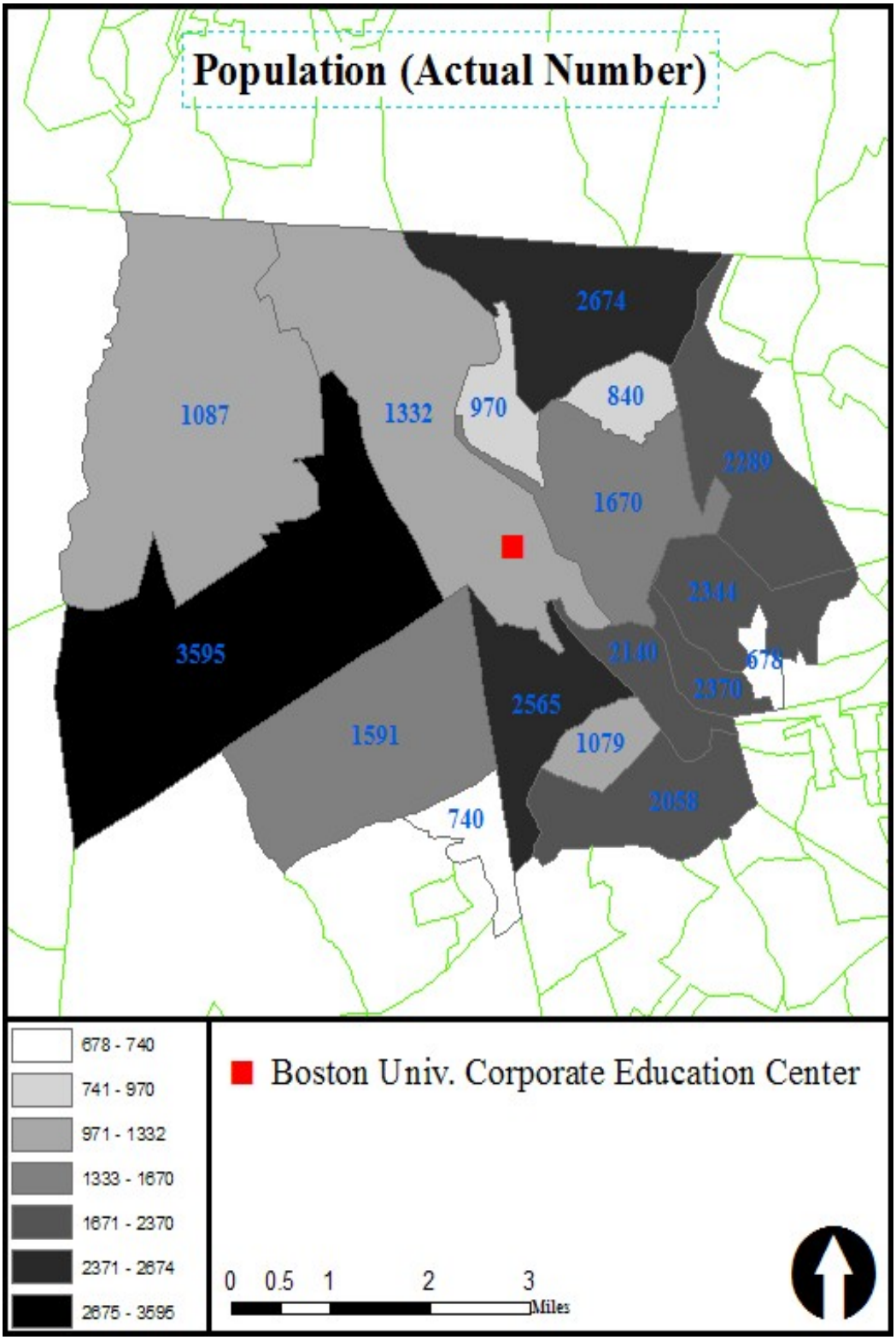

Figure IV-23. Population distributed by Block Groups, Tyngsborough, MA

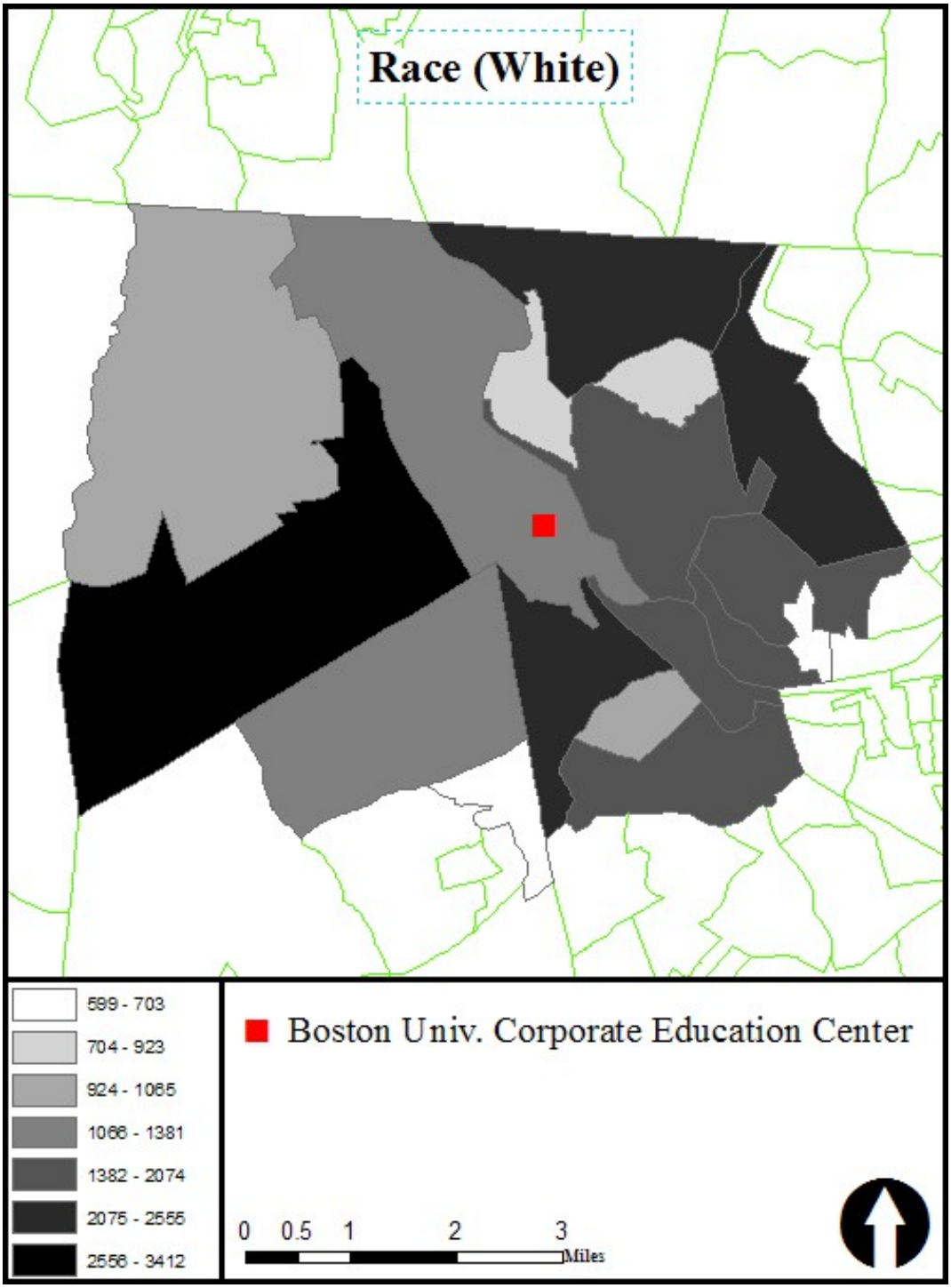

Figure IV-23. Population distributed by Race (White), Tyngsborough, MA

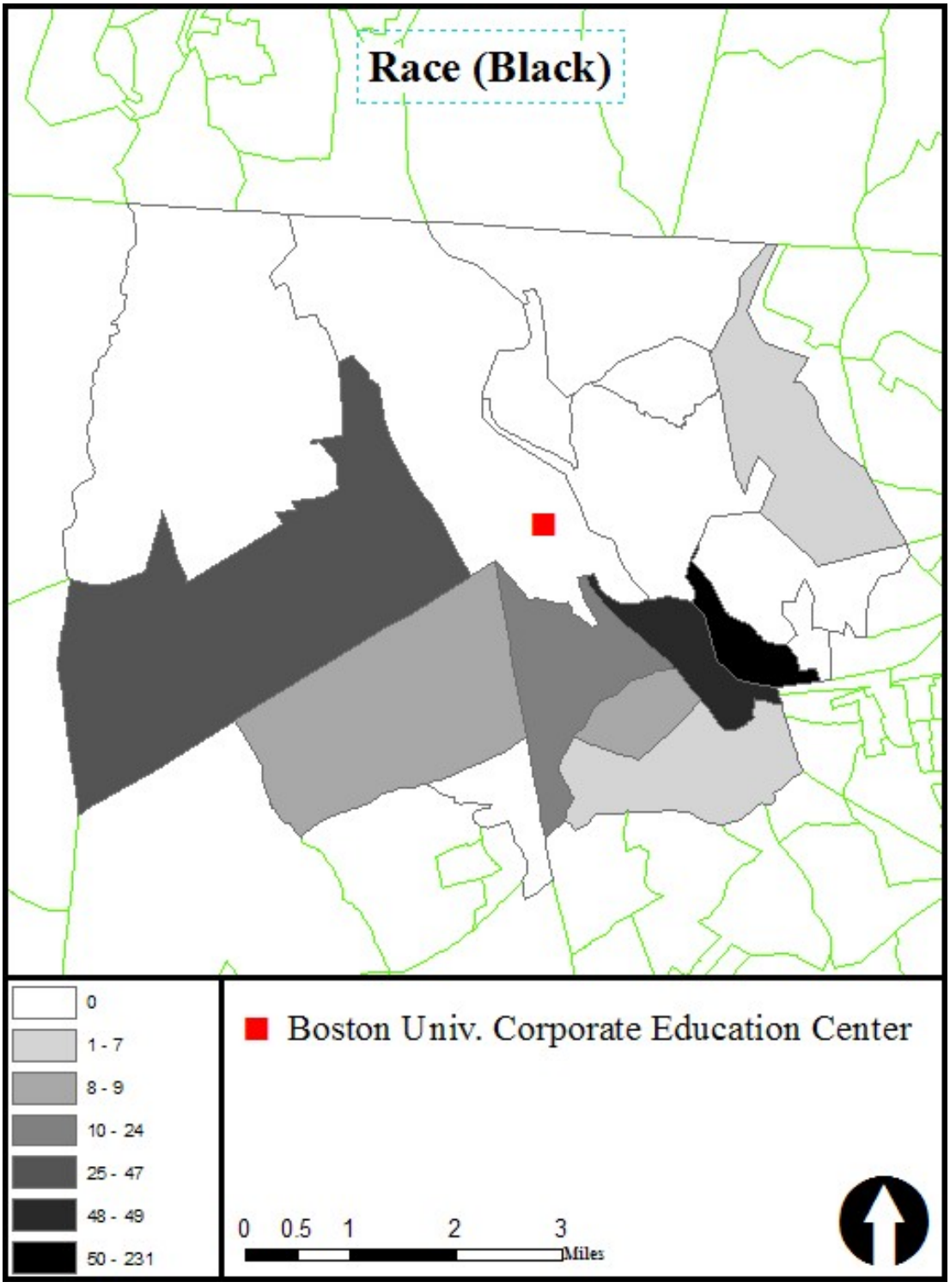

Figure IV-24. Population distributed by Race (Black), Tyngsborough, MA

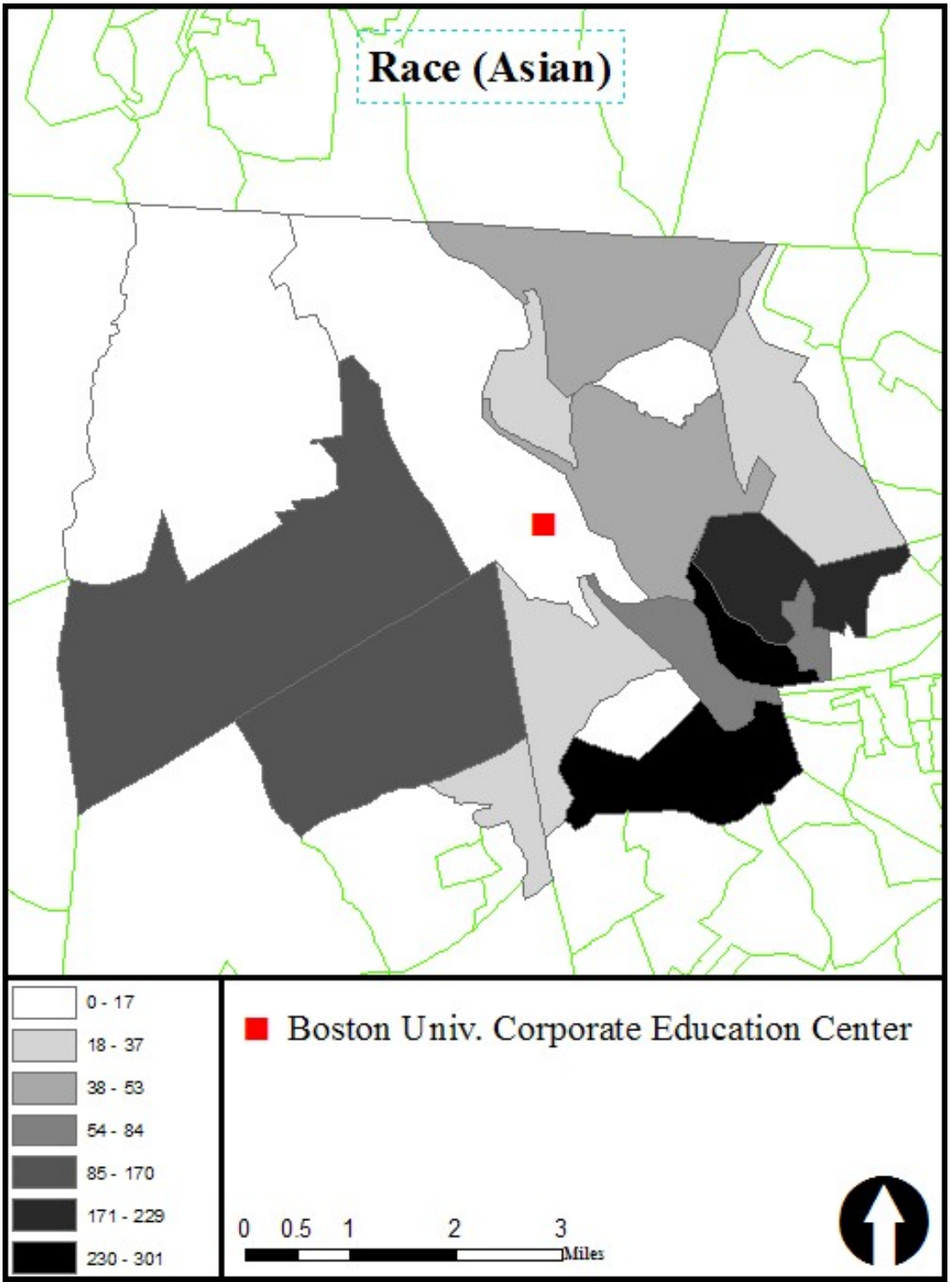

Figure IV-25. Population distributed by Race (Asian), Tyngsborough, MA

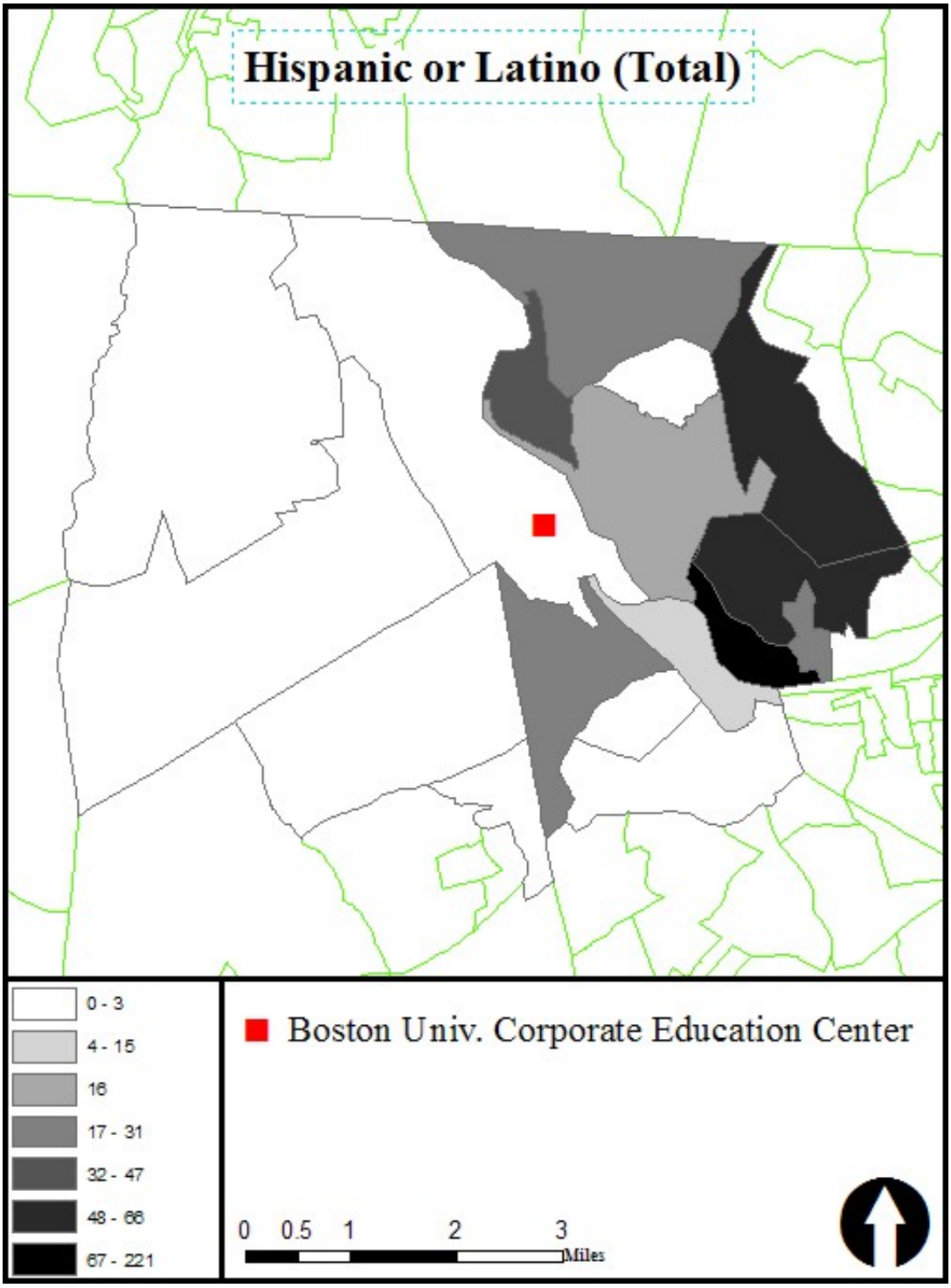

Figure IV-26. Population distributed by Race (Hispanic), Tyngsborough, MA

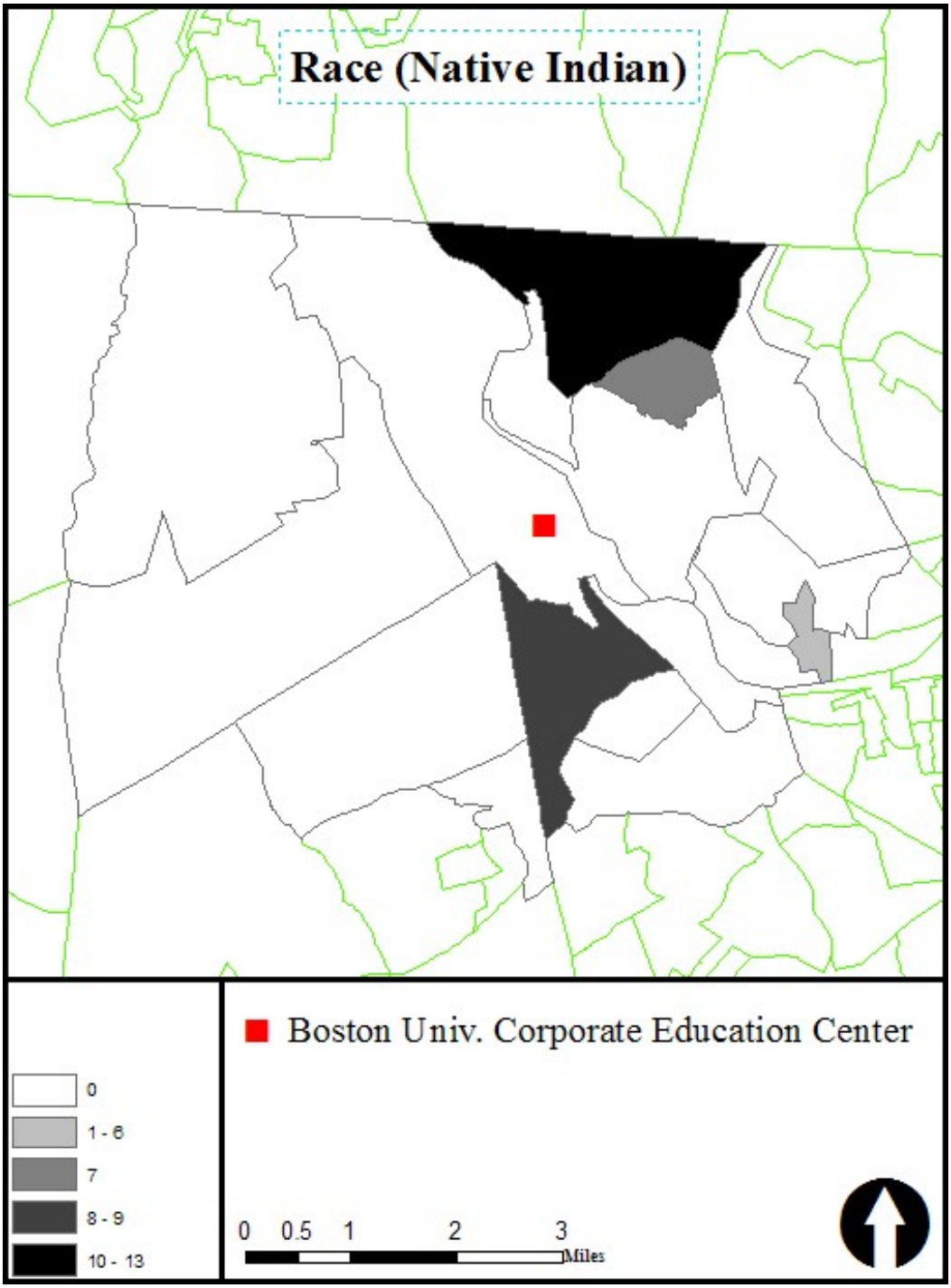

Figure IV-27. Population distributed by Race (Native American Indian), Tyngsborough, MA

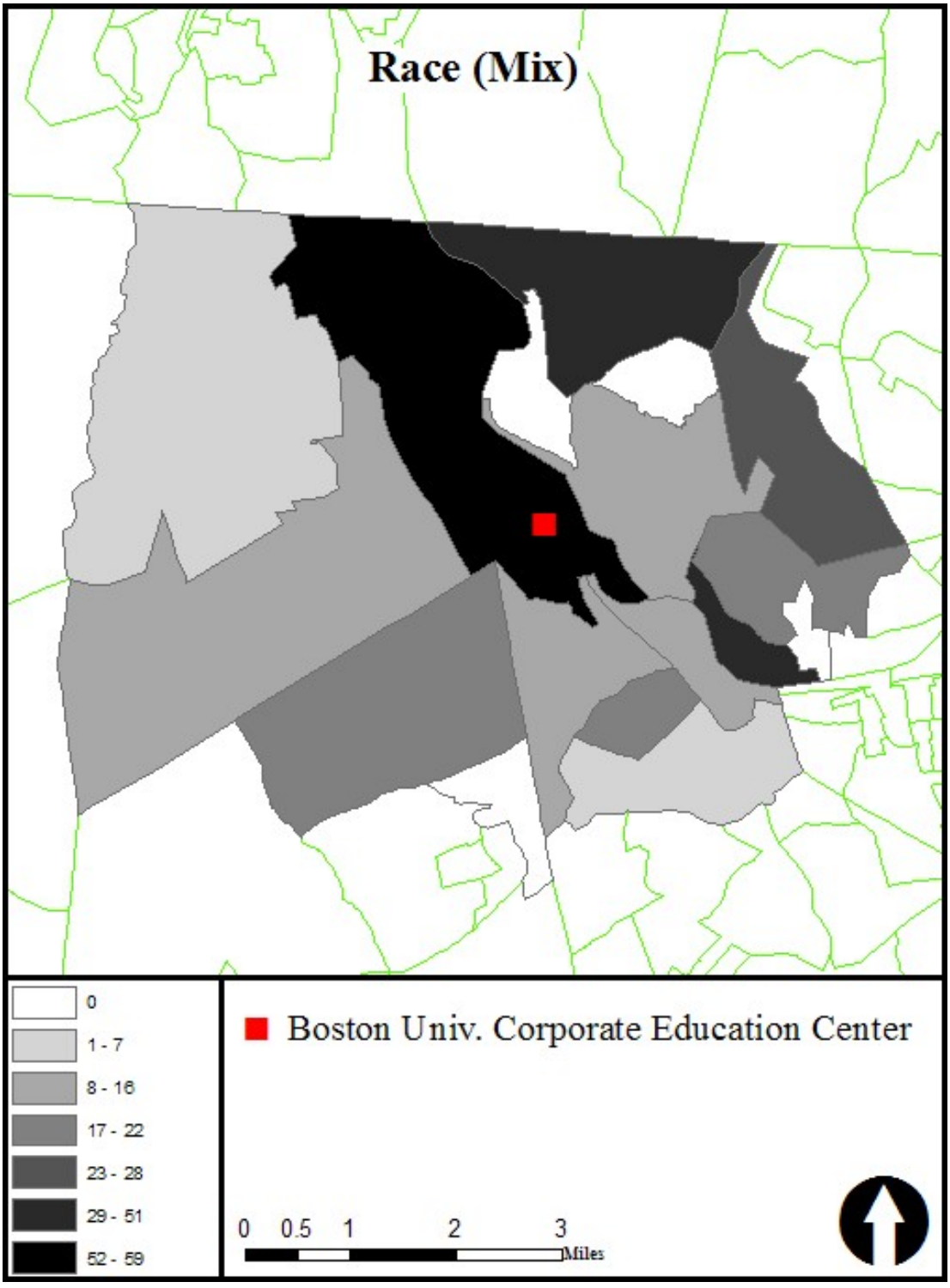

Figure IV-28. Population distributed by Race (Mixed), Tyngsborough, MA

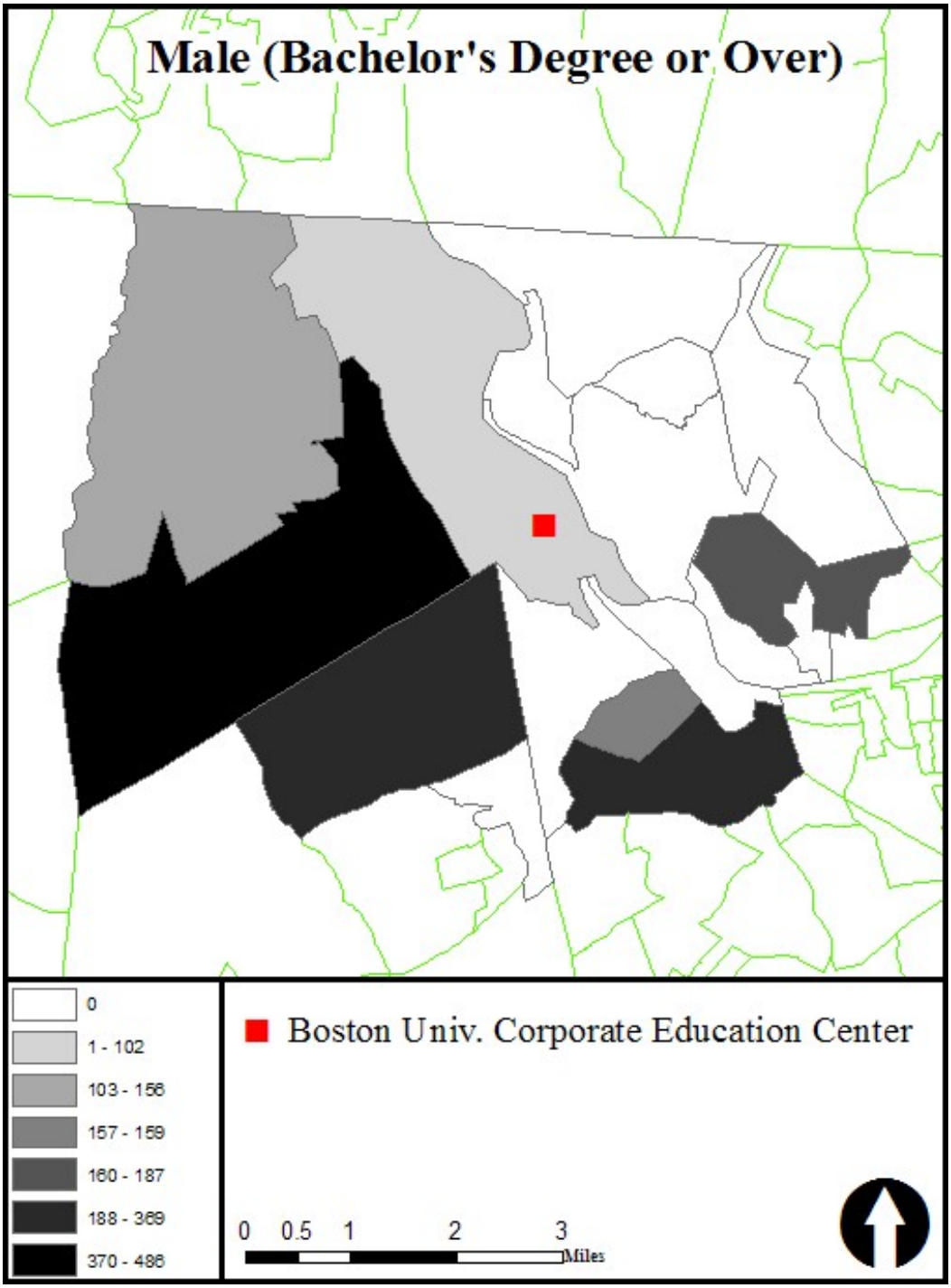

Figure IV-29. Males obtaining a four-year college degree or higher in Tyngsborough, MA.

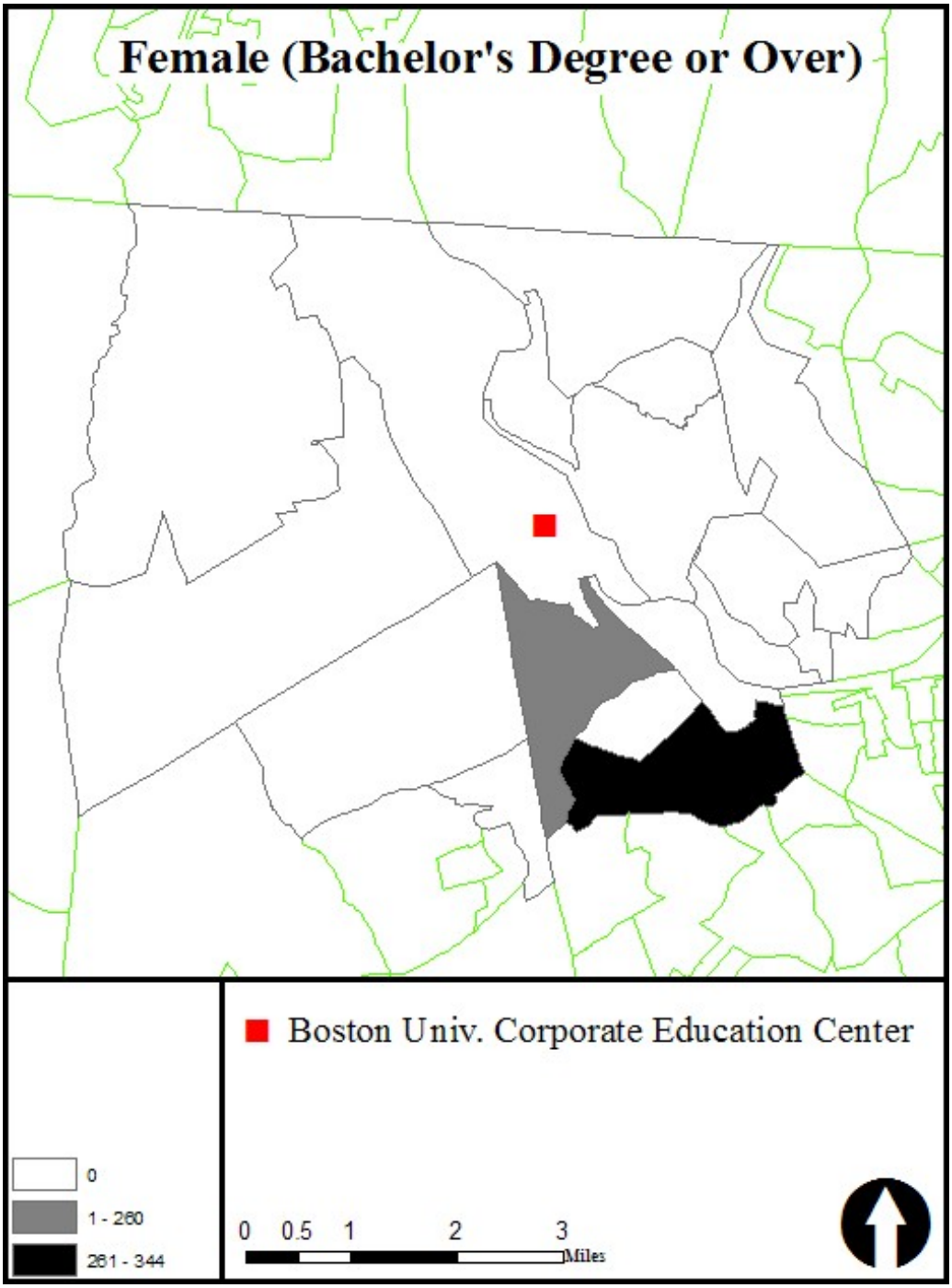

Figure IV-30. Females obtaining a four-year college degree or higher in Tyngsborough, MA.

Healthcare Facilities, Social Assistance and Emergency Response

Tyngsborough has professional police and fire departments and a professional staff assisting the Board of Health. The police department employs 25 full-time officers. The fire department employs 45 call firefighters, rotated through 4 full-time slots. The nearest fire station is 1.7 miles (approximately a 3 minute drive) north of the site. The small, local department may be challenged to respond to the safety and security requirements of a major research facility.

Tyngsborough does not have a hospital within the town limits but is served by Lowell General Hospital (LGH) located approximately eight miles away across the Merrimack River.

Figure IV-31. Lowell General Hospital in Lowell, Massachusetts

LGH is a 200 bed community hospital with a 12 bed intensive care unit; an 18 bed intermediate care unit; 2 medical/surgical units with 40 beds each; as well as pediatrics and maternity services and an outpatient cancer center. LGH has a daily patient census of 130-135 with between 11,000 and 12,000 discharges per year. LGH also operates an off-site outpatient surgery center. The Emergency Department (ED) has a negative pressure isolation room with no anteroom. There are eight standard isolation rooms in other areas of the hospital. One of these rooms has an anteroom. LGH has a Health Resources and Services Administration (HRSA) grant to renovate the isolation room in the ED to provide exhaust from this room directly to the out-of-doors. LGH has both an infection control practitioner and an emergency response coordinator. There are two flexible patient transporters and two mass decontamination units available on-site as well as a portable chemical decontamination shower for use at the ambulance entrance. Emergency drills are performed once per year. Ambulance services are provided by a

local company under contract to LGH with an established patient transport agreement and requisite protocols. An employee parking lot is cleared in the event that patient transport by helicopter is necessary. Members of the medical staff are board certified specialists; however LGH does not have an infectious disease specialist on staff though there is an infectious disease physician who provides consults as necessary. There is a full service clinical laboratory on the premises augmented by a reference laboratory as needed. LGH is fully accredited by the Joint Commission for Accreditation of Healthcare Organizations (JCAHO).

In the event of a serious incident, exposure, or infection in an individual associated with the NEIDL; LGH would stabilize and then transport the patient to a more comprehensive healthcare facility by an appropriate method (e.g., ambulance or helicopter) based on the stability of the patient and other factors such as weather conditions.

In addition to LGH, the Tyngsborough area has a small number of ambulatory healthcare services (doctor's offices, clinics, etc) and convalescent/nursing residential care facilities.

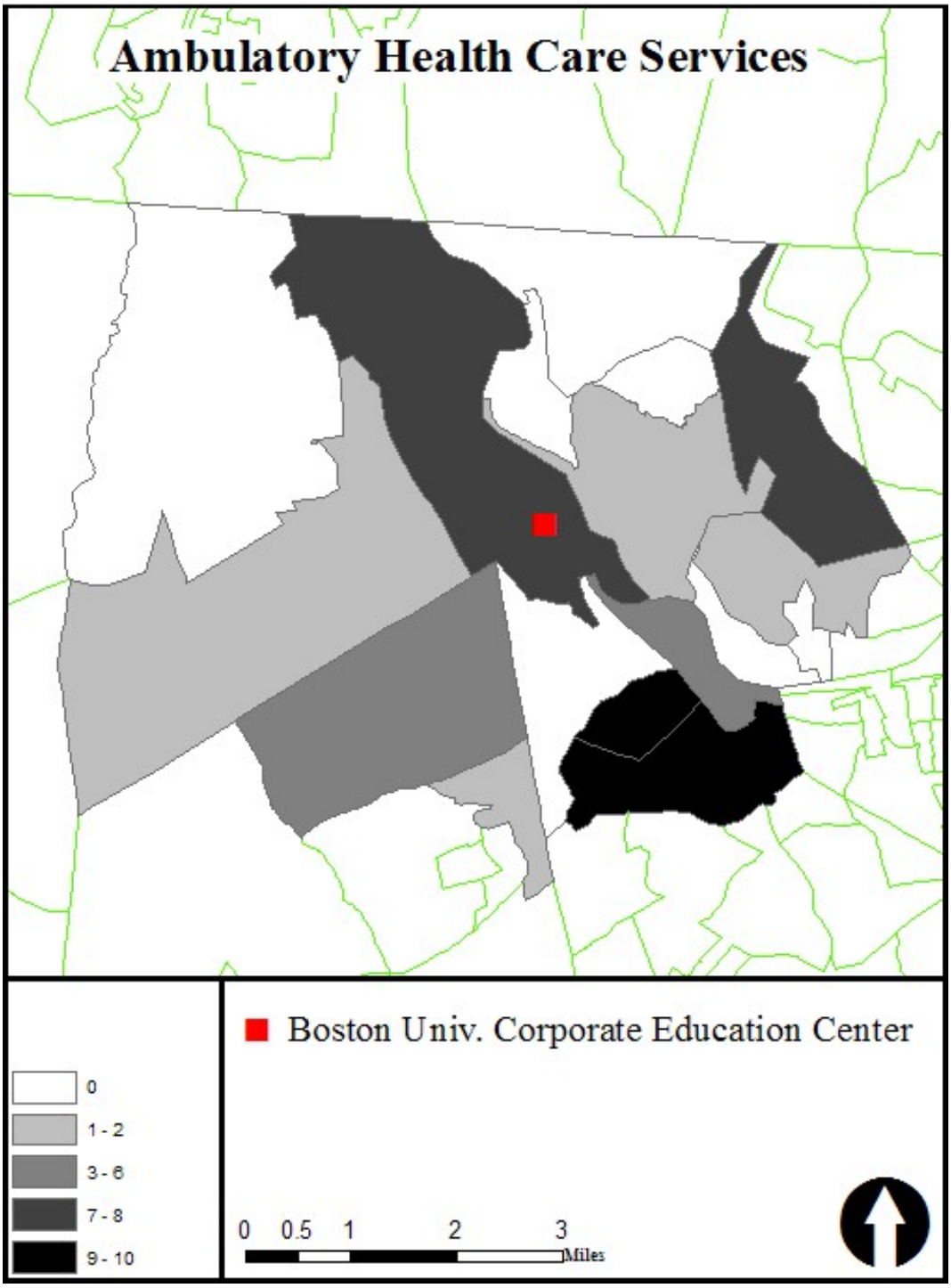

Figure IV-32. Distribution of Ambulatory Healthcare Services in Tyngsborough.

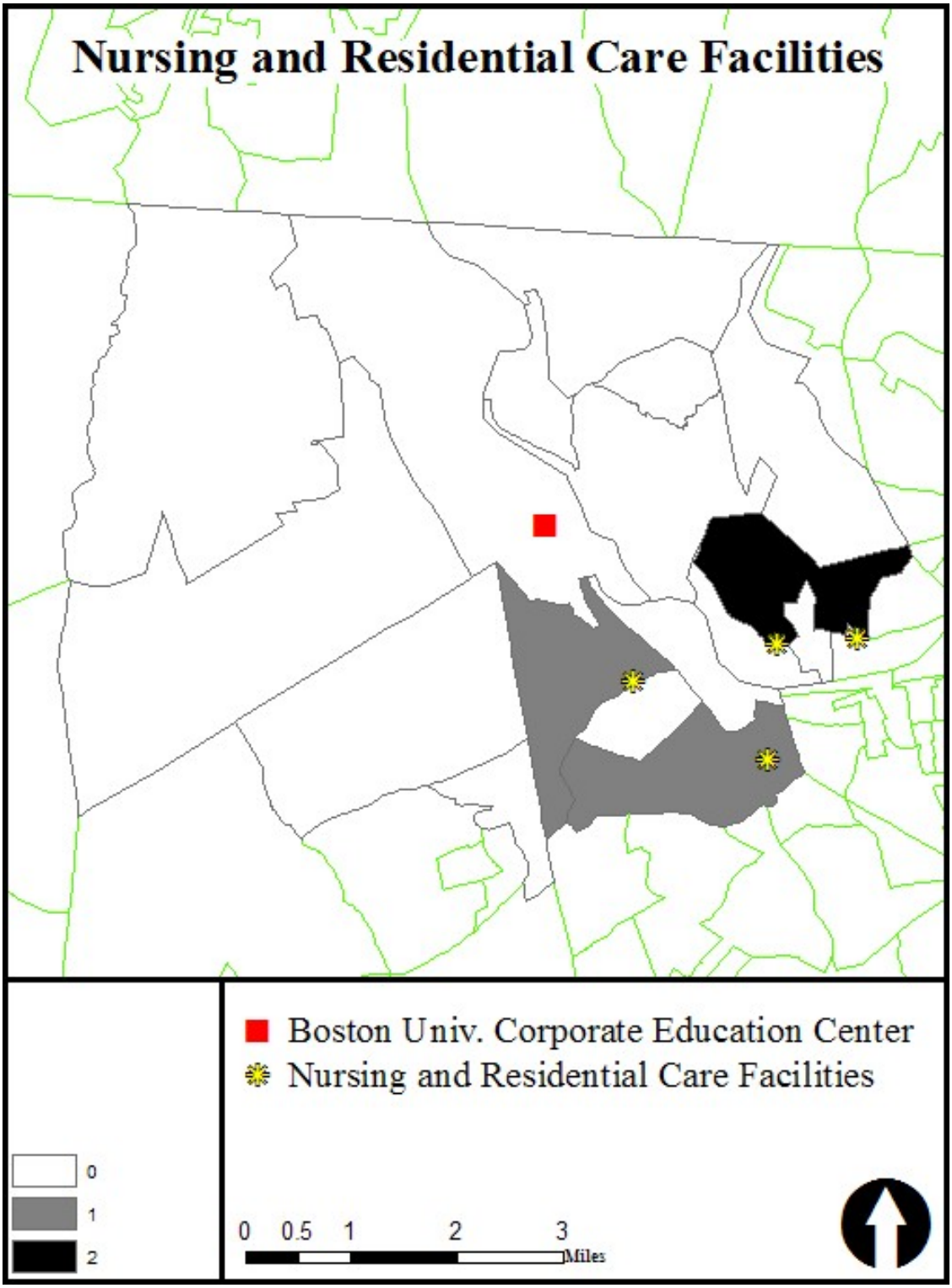

Figure IV-33. Distribution of Nursing and Residential Care Facilities in Tyngsborough.

Tyngsborough and the surrounding area have 17 elementary and secondary schools located in BGs within a three mile radius of the BUCEC site. The student population in Tyngsborough is expected to continue growing. Each year since 1998 actual enrollment surpassed the projected numbers. The new 40B housing projects will result in yet more students. There is a need for new enrollment projections to determine whether or not the schools have the capacity to absorb new growth especially taking into account 40 b housing developments. The influx of families due to construction and operation of the NEIDL, which was not considered during master planning, in Tyngsborough will further stress the school system.

Table IV-4. Past Projections Compared to Actual Growth in Student Population in Tyngsborough.

Year	Year Projected Total Student Population (PK- 12)	Actual Total Student Population (PK – 12)
1998	2020	2066
1999	2060	2139
2000	2116	2185
2001	2184	2253
2002	2245	2270
2003	2303	2263

The Greater Lowell Regional Vocational Technical School is located at 250 Pawtucket Boulevard in Tyngsborough. There were 1, 860 students enrolled in the school (2003); approximately 4% were from Tyngsborough. The percentage of students from Tyngsborough has been steadily increasing over the last 2-3 years as the school has been working closely with the Junior High. Although the Vocational School currently does not have the funds to expand, they have a very large waiting list (approximately 1100 students applied for 500 openings in 2000) mostly from Lowell. The Town recreational leagues have access to the Vocational School facilities, some are schools use the Vocational School's Olympic size swimming pool, and the elderly from Tyngsborough come to the Vocational School for a hair cut and lunch.

There are also two private schools in Tyngsborough: the Academy of Notre Dame Elementary School and the Academy of Notre Dame High School. A regional educational facility, the Boston University Corporate Education Center is also located in Tyngsborough. There are six institutions of higher learning within a very small distance from Tyngsborough, but located in adjacent towns: Middlesex Community College in Lowell, Northern Essex Community College in Haverhill and Lawrence, Merrimack College in North Andover, UMASS - Lowell in Lowell, Daniel Webster College in Nashua and Rivier College, also in Nashua, New Hampshire.

Other social assistance and services available in the immediate area of consideration include individual and family services; community food and housing, emergency and other relief services; vocational rehabilitation services; and child day care services. Services included in this description have been sited within the BGs surrounding the BUCEC in Figures IV-34 and 35.

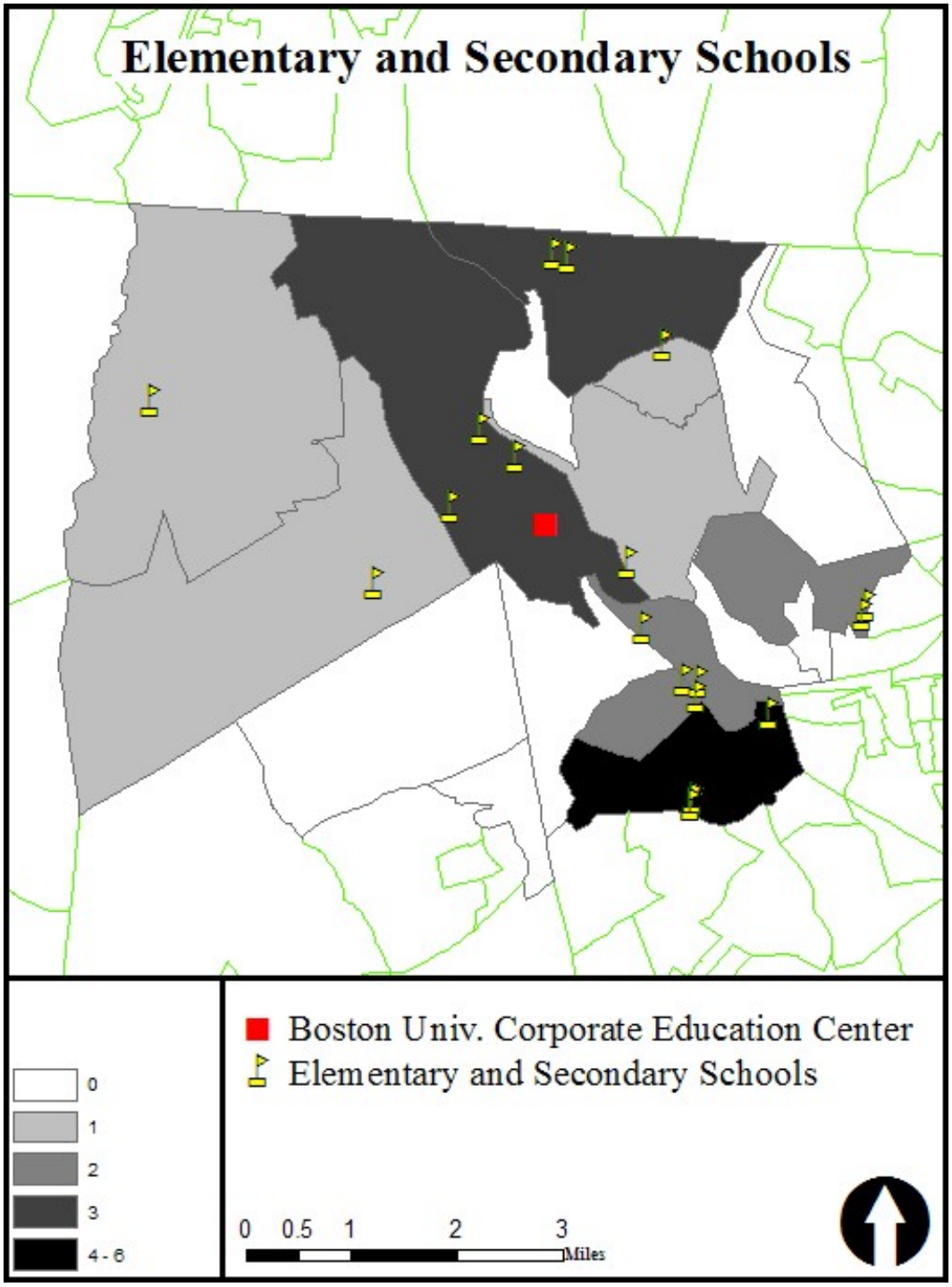

Figure IV-34. Distribution of elementary and secondary schools by Block Group in Tyngsborough.

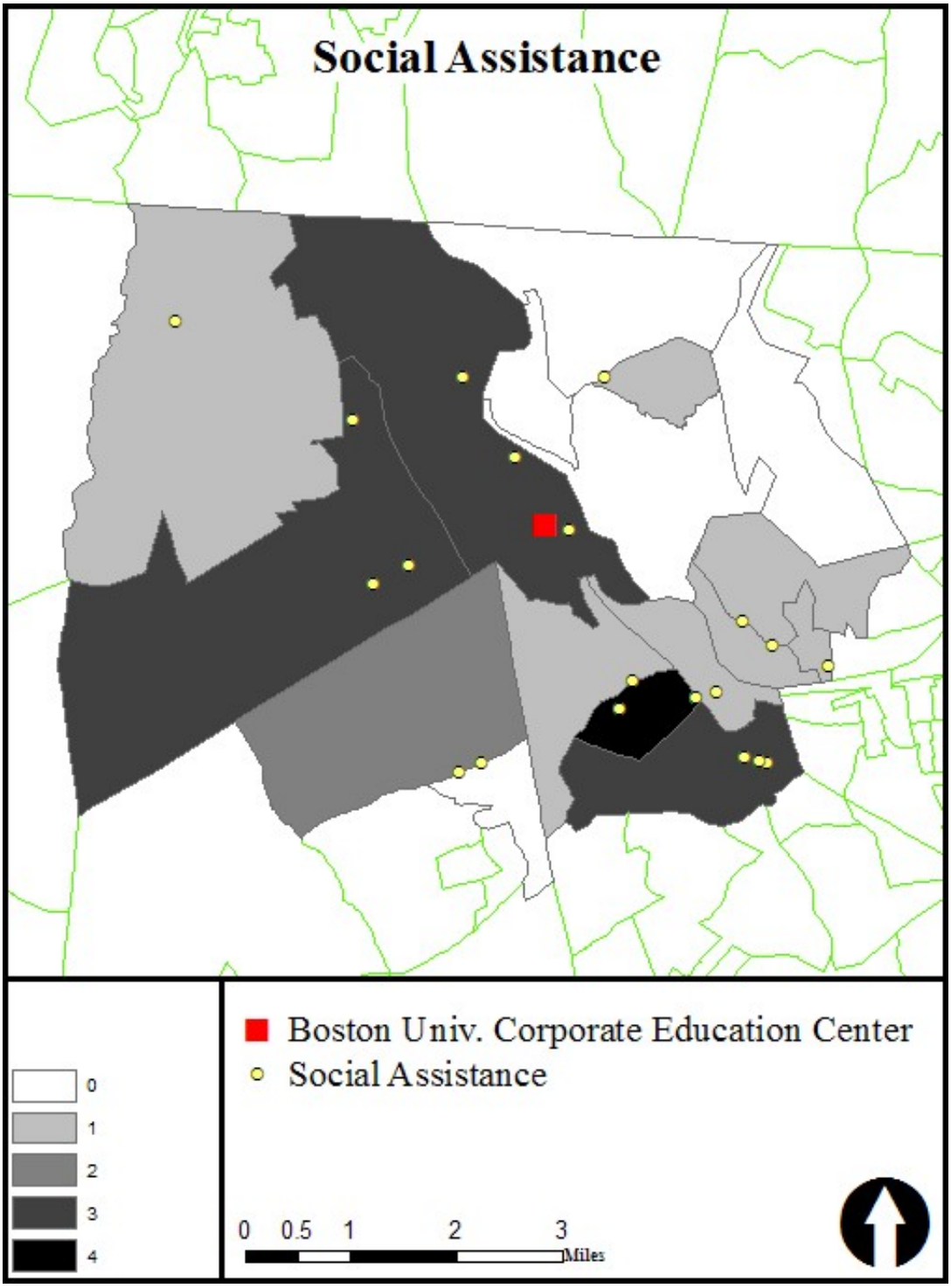

Figure IV-35. Distribution of social assistance services by Block Group in Tyngsborough. These services include individual and family services; community food and housing; vocational rehabilitation services; emergency and other relief services; and child day care services

Floodplains

Flooding is not a major problem in Upper Basin (Chelmsford, Dunstable, Groton, Littleton, Harvard, Tyngsborough, Westford) watershed area, but localized incidents caused by beaver activity are prevalent sources of complaints. The Merrimack River shoreline in Chelmsford and Tyngsborough is occasionally subject to erosion due to operation of the Pawtucket Dam, which can generate water level fluctuation (Mass DEP 2002).

Wetlands, Riparian Areas and Surface Waters

Executive Order 11990, Protection of Wetlands, 42 CFR 2691 (1977) as amended by Executive Order 12608, 52 F 34617 (1987), and 42 U.S. Code 4321 direct each federal agency to minimize destruction, loss or degradation of wetlands and to preserve and enhance such wetlands in carrying out their program responsibilities. Consideration must include a variety of factors such as water supply, erosion, and flood prevention, maintenance of natural systems and potential scientific benefits.
There are numerous lakes, ponds and streams draining the Tyngsborough area. Also, close by is the Merrimack River which is less than 0.2 mile from the BUCEC site. Storm water from the BUCEC drains into the local pond; the streams that are nearby; and the Merrimack River. There is no coastal water body in the Merrimack Valley.

The BUCEC site contains wetlands, a pond, small brooks, and abandoned quarries that appear they may be wetlands. Promoting groundwater recharge is an issue of great importance to the community of Tyngsboro. Approximately 40% of residents receive their water via wells. Signs are posted throughout the BUCEC site to remind people that this area is a drinking water area. Developing part of the area by adding impervious parking areas, sidewalks, and buildings could minimize recharge in that specific footprint of development. The building of the facility, however, is not expected to impact any of the existing wetlands or water bodies on the site. The construction and operation of the building would be expected to follow all BMPs for protection of surface and groundwater. All applicable laws and permits would be complied with the NEIDL if it were constructed in Tyngsborough.

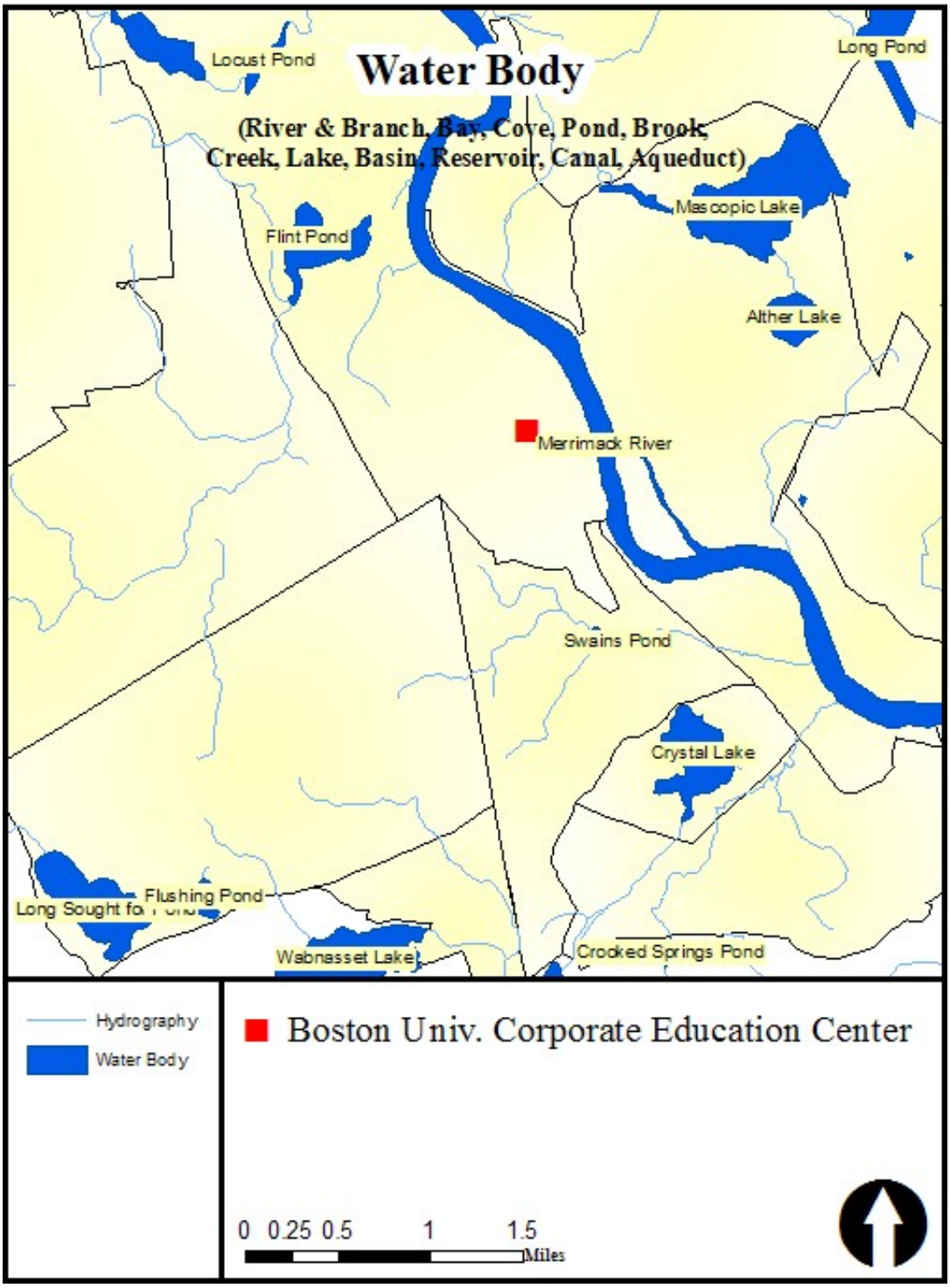

Figure IV-36. Water bodies in and around Tyngsborough. Source: Geographic Data Portals – Download Data – Census 2000 TIGER/Line Data – Line Features – Hydrography

The Merrimack River and Other Surface Water Resources. One of Tyngsborough's prize natural resources is the Merrimack River. More than five miles of the river run through the town. This river corridor offers Tyngsborough and other adjacent towns opportunities for active and passive recreation, education, and habitat preservation. Importantly, it also serves as water supply for much of Tyngsborough, Dracut and several other communities along its course. For many rivers in Massachusetts water withdrawals can result in a low-flow problem in summer and winter months. This has not been such a problem with the Merrimack because of its large watershed. Water quality is another concern. The river passes through urban areas where storm run-off and other sources of pollution are issues. Protection and conservation of the water resources of the Merrimack River requires regional cooperation. The Scenic and Recreational River Protection Act administered by the Massachusetts Department of Environmental Management establishes a protected two hundred feet wide corridor along each side of major rivers. This corridor limits certain activities and uses within the corridor in order to protect private and public water supplies; to provide flood control; to prevent storm damage; to prevent pollution; to protect wildlife habitat; and to protect fisheries.

Streams in Tyngsborough include: Bridge Meadow Brook, which originates on Scribner Hill and flows into Flint Pond; Lawrence Brook flows from Norris Corner along Lawndale Road and into the Merrimack River just upstream from the Tyngsborough Country Club; Limit Brook flows out of Hudson, New Hampshire and into the Merrimack River near Frost Road; Scarlet Brook flows out of wetlands between Althea Lake and the State Forest and into the Merrimack River after passing the regional vocational school; and Locust Brook flows from Locust Pond along Locust Avenue into the Merrimack River near Farwell Road. Lake Mascuppic, once known as Tyng Lake, is another important surface water feature.

Former summer cottages that have been converted to year-round residences surround most of the lake. At more than 205 acres it is the town's largest pond and site of the small Town Beach. A small portion of the lake is in Dracut. Lake Mascuppic is at risk because of declining water quality. Storm water run-off, yard fertilizers, fecal matter from non-migratory geese and ducks, and motor boats and jet skis that stir up old deposits of nutrients are all contributing to high nutrient levels in the lake. These nutrient levels result in rapid plant growth and "clogging" of the pond. A Lake Mascuppic study committee was recently formed to recommend possible solutions.

Other ponds include nearby Althea Lake; part of Long Pond, in the northeast corner oftown; Locust Pond, near the intersection of Route 3 and Kendal Road; Flint Pond, near the center of town; and Massapoag Pond, at the western boundary of the town. Flint Pond with a maximum depth of 8 feet is known as a good fishing location for bluegill, brown bullhead, chain pickerel, largemouth bass, pumpkinseed, yellow bullhead, and yellow perch. Contamination from the Charles George landfill was a

concern for eating fish caught in Flint Pond, but recent monitoring results show no health reason for on-going concern—still heavy metals, one of the known contaminants, persist in the environment. Althea Lake with a maximum depth of 15 feet is also known for good fishing, as is Lake Mascuppic. American eel, black crappie, and white perch can be caught in Lake Mascuppic along with the species mentioned above.

Water Supply. Tyngsborough and several other communities draw water from areas along the Merrimac River. Approximate 60% of the town is served by public water. Tyngsborough can draw water from 14 DEP-permitted community wells. A community well serves at least 15 connections. A non-community water supply serves 25 or more persons at one location such as a school, factory or restaurant. Dracut also has five wells in Tyngsborough off of Frost Street. Interim Wellhead Protection areas are intended to protect water supplies. A radius based on the flow rate of the well defines these areas. Certain land uses may be either prohibited or restricted in these areas (see 310 CMR 22.00 the Massachusetts Drinking Water Regulations).

Aquifers

Some important aquifers or ground water recharge areas are found within the boundary of Tyngsborough. A high yield aquifer (more than 300 gpm) lies under the Dracut well fields, and downstream between the river and Middlesex Road. Lower yield aquifers (100 to 300 gpm) are located along Bridge Meadow Brook, near the intersection of Westford Road and Dunstable Road, near Flint Pond, along the Merrimac River, and at Tyng Island. The town's wells are located near these lower yield aquifers or along Lawrence Brook.

Habitat, Wildlife and Vegetation

The following sections describe the regional, local, and site specific characteristics of habitat, wildlife, and vegetation.

Regional

Wetlands. Wetlands, including both forested wetlands and non-forested wetlands, are an important water resource in Tyngsborough. They play a critical role in flood control and in maintaining water quality. There are no extensive areas of wetlands. Instead, smaller wetlands are found to the north of Althea Pond and to the west of Flint Pond. Other areas follow Lawrence Brook, Bridge Meadow Brook, and Locust Brook. There are also small isolated wetlands scattered around town. These wetlands provide visual variety, wildlife habitat, and help maintain a healthy environment. Carefully orchestrated access to some of these wetlands will increase community awareness of their value and interest as natural habitat. A good example is the trails at the Sherburne Land. Title V, the state provisions that regulate the construction of wastewater treatment

facilities and private septic systems, also establishes a buffer zone around these wetlands and associated waterways.

Figure IV-36. Potential NEIDL site at the BUCEC in relation to open space opportunities, wetlands, and a National Registry of Historic Places site.

Riparian Corridors. The Massachusetts Resource Identification Project designated "natural land riparian" corridors along waterways and wetlands. These 100-meter natural corridors are thought to provide avenues of movement for some wildlife species and fulfill other ecological functions.

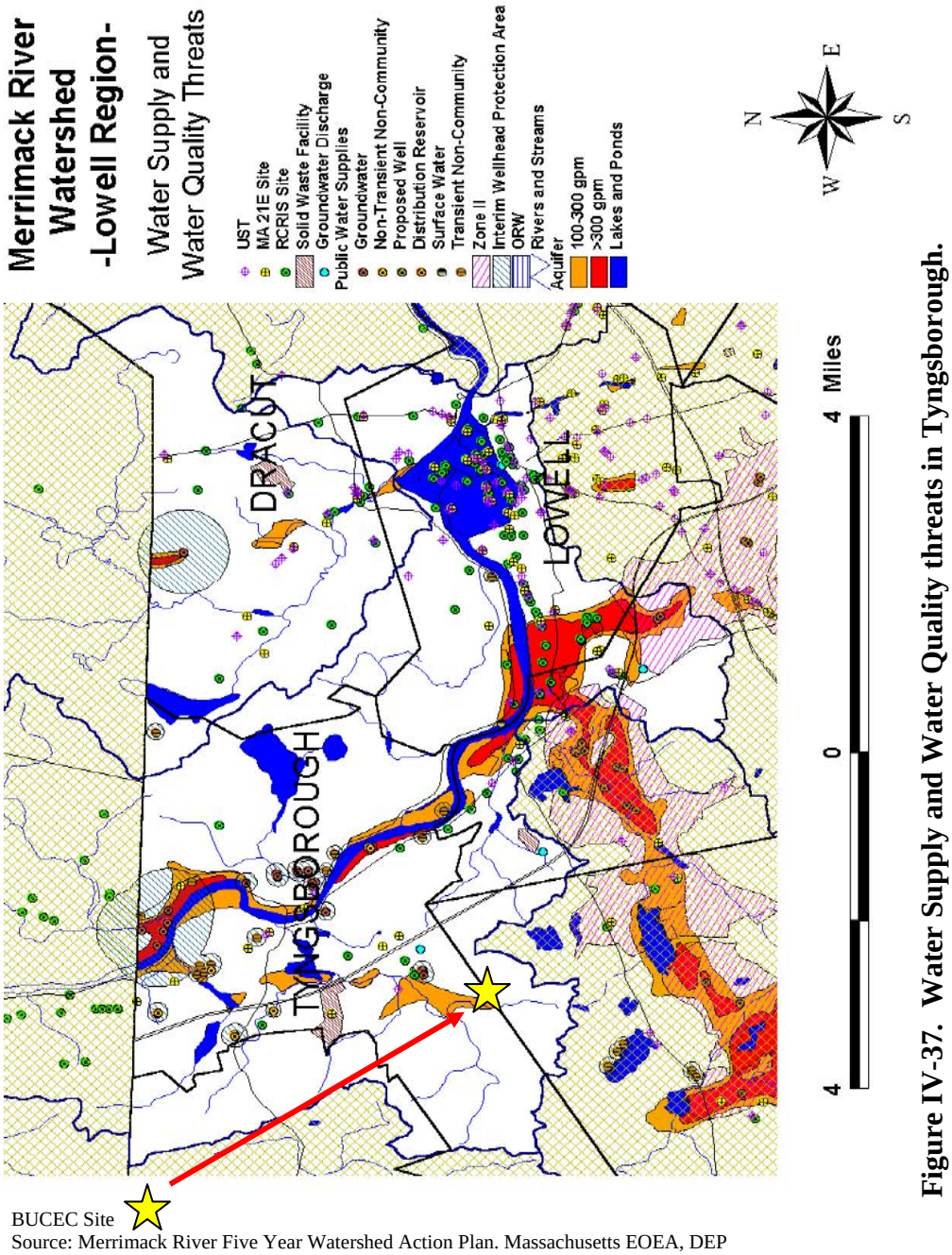

Figure IV-37. Water Supply and Water Quality threats in Tyngsborough.

Source: Merrimack River Five Year Watershed Action Plan. Massachusetts EOEA, DEP
www.mass.gov/envir/water/publications/WAPs/Merrimack_WAP_2002.pdf

Figure IV-38. East corner wetlands.

Figure IV-39. East corner wetlands.

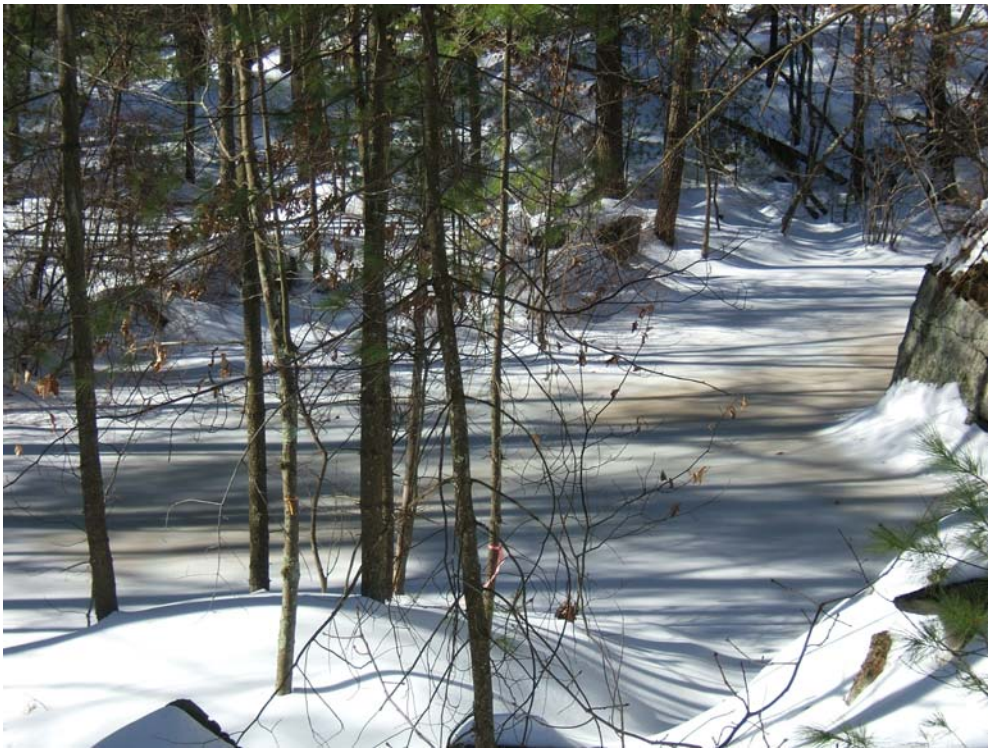

Figure IV-40. The Old Quarry.

Figure IV-41. Groundwater Recharge Signage

Figure IV-42. Pond on alternate NEIDL site at BUCEC.

Figure IV-43. The Merrimack River as viewed from Route 3A .

Area of Critical Environmental Concern. The Petapawag Area of Critical Environmental Concern (ACEC) was designated on December 11, 2002 and covers land area in the Nashua River and Merrimack River watersheds. Seventy acres in Tyngsborough fall within the ACEC.

The Petapawag ACEC is approximately 25,630 acres in size, and is located in portions of Ayer, Dunstable, Groton, Pepperell, and Tyngsborough. The Petapawag ACEC is located along and to the east of the Nashua River, from the Town of Ayer north to New Hampshire. It is adjacent to the Squannassit ACEC, which is located along and to the west of the Nashua River from Route 2 in Harvard and Lancaster north to New Hampshire (the boundary of the Squannassit ACEC connects to the boundary of the Central Nashua River Valley ACEC to the south, along the Nashua River corridor). The Petapawag and Squannassit ACECs share
the Nashua River corridor and its associated physical, biological and cultural resources and history. Although the two areas were nominated and designated as separate ACECs, it is important to state that the Nashua River corridor is a central resource feature of both of these ACECs.

Water Supplies within the ACEC. There are significant drinking water resources present within the ACEC. High and medium-yield aquifers are located in all five towns of the ACEC. According to GIS mapping and recent Division of Environmental Protection data, there are five municipal wells located within the ACEC. The combined area of high- and medium-yield aquifers and the Zone II
and Interim Wellhead Protection Areas for current water supply facilities totals approximately 3,570 acres, or 14% of the ACEC.

Habitat Resources. According to the Natural Heritage & Endangered Species Program (NHESP), documented records from their database indicate that there are 16 state-listed rare species known to occur within the boundaries of the Petapawag ACEC (all of these species need to be listed in a table). This number includes seven Endangered Species, one Threatened, and eight listed as species of Special Concern. One of the state-listed Endangered species is also federally-listed as Threatened. Priority Habitats and Estimated Habitats for Rare Wildlife mapped by the NHESP cover approximately 2,560 acres or 10% of the ACEC. The BioMap project of NHESP, published in 2001, delineated as Core Habitat those areas of the state which, if protected, would protect the most viable populations of rare plants and animals, the best examples of natural communities, and the breadth of biodiversity of the state. Approximately 13,910 acres or 54% of the Petapawag ACEC is BioMap Core Habitat. In addition, approximately 3,720 acres or 15% of the ACEC is designated as Supporting Natural Landscape, which are large, generally unfragmented areas that safeguard the Core Habitat while also including habitat for the common species of Massachusetts. Combined Core Habitat and Supporting Natural Landscape cover approximately 69% of the ACEC. There are 15 NHESP Certified Vernal Pools within the ACEC. Also within the ACEC are 332 Potential Vernal Pools as identified through photo-interpretation by the NHESP in the 2001 Massachusetts Aerial Survey of Potential Vernal Pools. Portions of two “herp reserves” identified by the

NHESP cover approximately 13,900 acres or 54% of the ACEC. From 1998 through 2000, the NHESP surveyed sites across the state for state-listed rare reptiles and amphibians, eventually choosing nine areas as potential "herp reserves" because of the presence of multiple rare herptile species, relative lack of habitat fragmentation, and diversity of wetland types interspersed with undeveloped uplands. The reserve areas were delineated around known rare species sites based on dispersal distances and habitat use for each rare herptile species represented at a site, so that the population of each species could have a high likelihood of long-term persistence.

An assessment of the site would be required prior to any development to ensure that threatened and endangered species were not present at the site.

Land Use and Open Space in the ACEC. According to Mass/GIS data, approximately 66% of the ACEC is comprised of forest and farmland. (Approximately 14,160 acres or 55% of the ACEC is comprised of forestland and approximately 2,670 acres or 10% is farmland.) Nearly 30% of the ACEC is comprised of protected open space and land under Chapter 61, 61A and 61B tax classification status. (Protected open space covers approximately 4,340 acres or 17% of the ACEC, and Chapter 61, 61A and 61B lands cover another 3,130 acres or 12% of the ACEC.) The area contains unique and highly significant archaeological and historical resources, as well as scenic landscapes of statewide significance. There are three state-listed Historic Districts located in Groton. These Historic Districts are part of or are surrounded by scenic landscapes included in the 1982 Massachusetts Scenic Landscape Inventory prepared by the Department of Environmental Management (now the Department of Conservation and Recreation). Approximately 6,820 acres or 27% of the ACEC, are included in the Inventory.

Further development of the BUCEC site would not support these open space initiatives.

Water bodies included (partially or entirely) in the ACEC

Lakes, Ponds: Flannagan Pond, pond south of Long Pond, Ayer; Lower Massapoag Pond, pond north of Hound Meadow Hill, Dunstable; Upper Massapoag and Wattles Ponds, pond at Burntmeadow,Groton; Pepperell Pond, Groton/Pepperell

Great Ponds: Sandy/Sand Pond, Ayer; Long Pond, Ayer/Groton; Massapoag Pond, Dunstable/Groton/Tyngsborough; Knops Pond/Lost Lake, Whitney/Cow Pond, Martins and Baddacook Ponds, Groton

Rivers, Streams, Brooks, Creeks: Nashua River, Ayer/Dunstable/Groton/Pepperell; Nissitisset River, Pepperell; James Brook, Ayer/Groton; Black, Camp, Hauk, Horse Hill, Joint Grass and Short Brooks, Dunstable; Baddacook Pond, Blood, Cold Spring, Cow Pond, Martins Pond, NEFF, Nod, Naumox, Oxbow, Swamp and Tuity Brooks, Groton; Reedy Meadow and Unkety Books, Groton/Pepperell; Gardner, Greens, Kemp, Straight and Varnum Books, Pepperell; and several unnamed brooks.

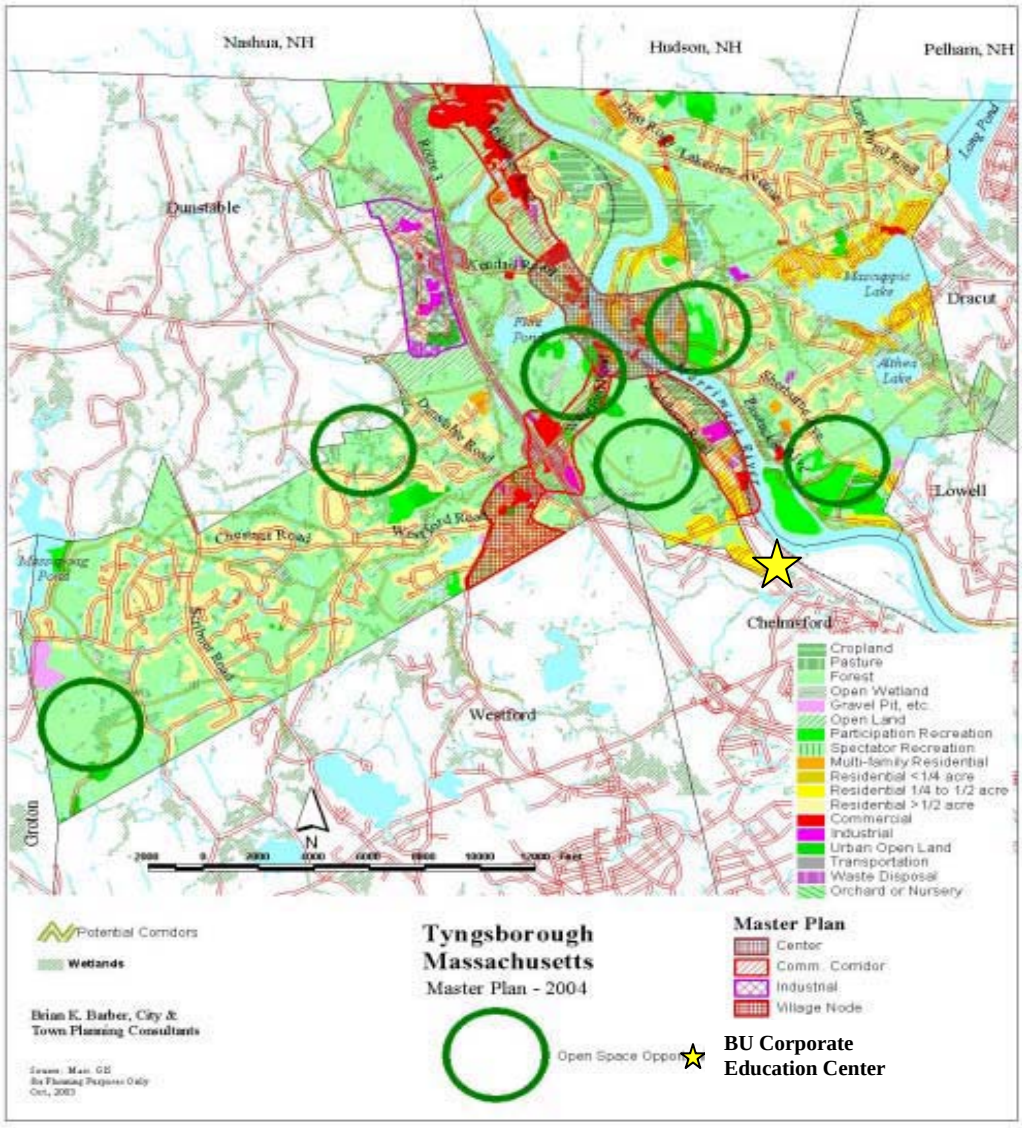

Figure IV-44. Land usage map for Tyngsborough. Source: Master Plan for Tyngsborough, Massachusetts at http://www.tyngsboroughmass.com/Master_Plan/4-16-04%20Plan%20Redraft.pdf .

Records from the Natural Heritage & Endangered Species Program (NHESP) database indicate that there are 16 state-listed rare species known to occur within the boundaries of the Petapawag ACEC. This number includes seven Endangered Species, one Threatened,

and eight listed as species of Special Concern. One of the state-listed Endangered species is also federally-listed as Threatened. Priority Habitats and Estimated Habitats for Rare Wildlife mapped by the NHESP cover approximately 2,560 acres or 10% of the ACEC. The BioMap project of NHESP, published in 2001, delineated as Core Habitat those areas of the state which, if protected, would protect the most viable populations of rare plants and animals, the best examples of natural communities, and the breadth of biodiversity of the state.

Natural Communities within Tyngsborough.

Tyngsborough possesses a good example of a Water-willow-dominated Acidic Graminoid Fen community. Acidic Graminoid Fens are acidic peatlands that experience some groundwater and/or surface water flow but no calcareous seepage. Standing water is often present throughout much of the growing season. Acidic Graminoid Fens are considered vulnerable. This and other wetland habitats here support rare dragonfly species. Spruce Swamp and the surrounding area in Tyngsborough contain a large example of an Acidic Shrub Fen natural community, also considered vulnerable.

Vegetation

The Tyngsborough area contains one of only three populations of the endangered Low Bindweed (Calystegia spithamae) in the state. Low Bindweed is a short, upright vine with large white or pink flowers. The following map fully represents the types of vegetation found throughout Tyngsborough.

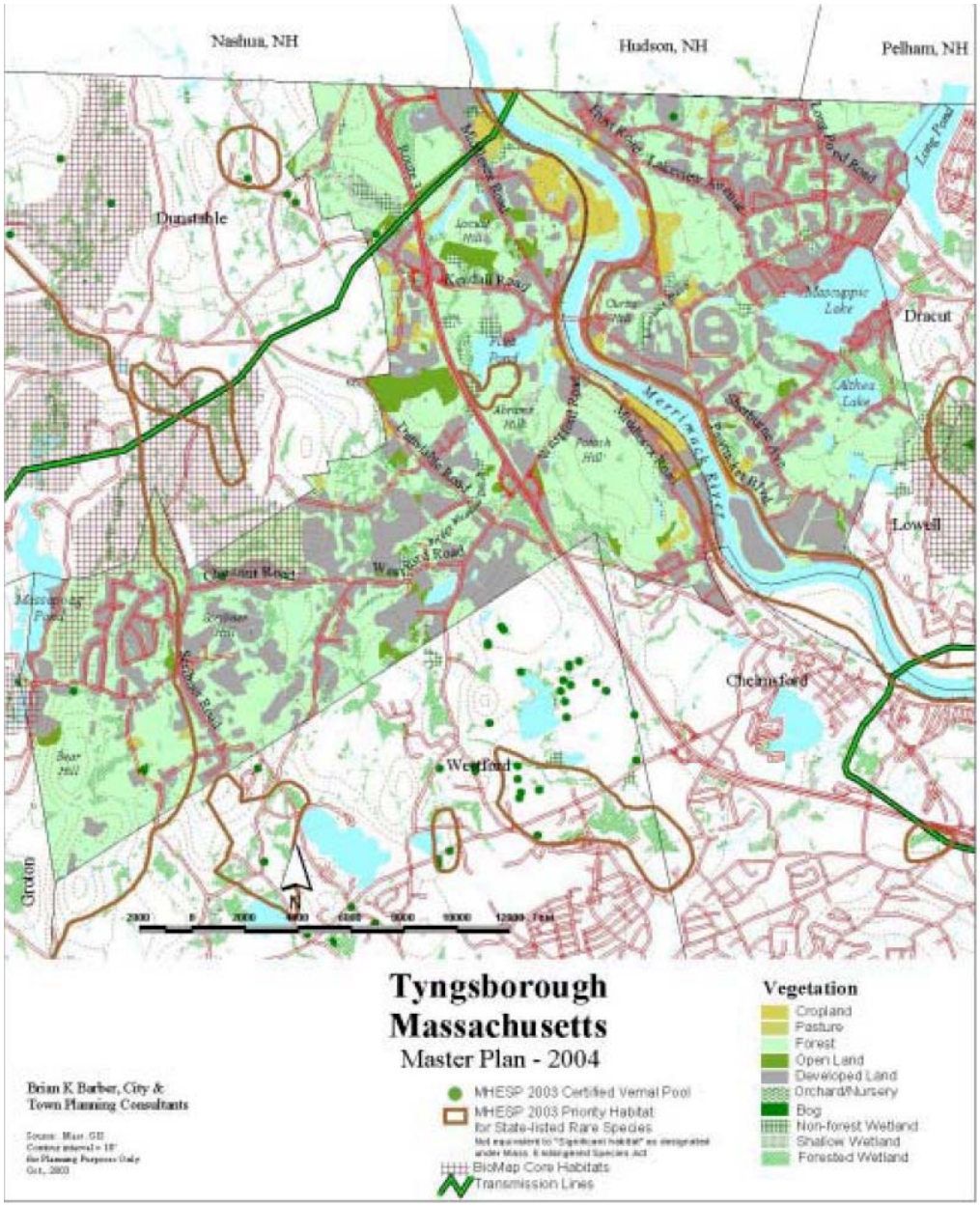

Figure IV-45. Vegetation Map, Tyngsborough. Source: Master Plan for Tyngsborough, Massachusetts at
http://www.tyngsboroughmass.com/Master_Plan/4-16-04%20Plan%20Redraft.pdf .

Wildlife

The three protected core habitats in Tyngsborough are comprised of a diverse mix of fresh marsh, wet meadows, wooded and shrub swamps, forested uplands, scattered small fields, and many Certified and Potential Vernal Pools. These areas include important habitats for Blanding's, Spotted, and Wood Turtles, as well as for Blue-spotted Salamanders. Unkety Brook and its associated wetlands and uplands support a significant population of Blanding's Turtles. Habitats here may also be used by Wood Turtles. Spotted Turtle populations may be widely distributed throughout this Core Habitat. Protection of undeveloped habitats may also represent an excellent opportunity for the long-term preservation of Blue-spotted Salamander populations, especially at several locations where multiple vernal pools and wooded swamps are present. The small streams and bordering wetlands in Tyngsborough also provides habitat for a known population of Southern Bog Lemmings. This elusive little field vole travels slowly but is active year-round. Southeastern Tyngsborough, has a relatively pristine, unfragmented habitat for rare dragonflies. Most of the habitat is within the Lowell-Tyngsborough-Dracut State Forest, and is protected; other lands within this area should also be protected to increase the amount of contiguous protected habitat and decrease its fragmentation, thus helping to ensure the long-term viability of the dragonflies and other rare species inhabiting the area.

The protected species are found in these habitats are listed in Tables IV-5 and 6.

Table IV-5. Protected Vertebrate Species in Tyngsborough.

Common Name	Scientific Name	Status
Blanding's Turtle	Emydoidea blandingii	Threatened
Blue-spotted Salamander	Ambystoma laterale	Special Concern
Spotted Turtle	Clemmys guttata	Special Concern
Southern Bog Lemming	Synaptomys cooperi	Special Concern
Wood Turtle	Clemmys insculpta	Special Concern

Table IV-6. Protected Invertebrate Species in Tyngsborough.

Common Name	Scientific Name	Status
Cobra clubtail damselfly	Gomphus vastus	Threatened
twelve spotted tiger beetle	Gomphus vastus (Cicindela duodecimguttata)	Threatened
purple tiger beetle	Cicindela purpurea	Threatened
New Jersey tea inchworm (moth)	Apodrepanulatrix liberaria	Endangered
Persius duskywing moth	Erynnis persius persius	Endangered

Site Specific

No wildlife or vegetation surveys have been conducted at the site. The vegetation primarily consists of mixed hardwood and pine wood forests. Vegetation and wildlife for the site would be typical of that found in the region as described above.

Prior to the initiation of any development, the area would be surveyed to determine the presence of any endangered or threatened species, or species of special concern. The impact to vegetation would consist of the removal of trees and other vegetation in the footprint of development.

Agriculture-Livestock

Tyngsborough is still predominately open land with active agriculture;
55% of the town is in open uses. See Table IV-7 and Figure IV-44. Residential uses account for 28% of land uses. Commercial and industrial uses account for only about 3% of the town's area. Agriculture, pasture and orchards account for about 4% of the town's land uses.

Table IV-7. Land Usage in Tyngsborough during 2001.

Land Use	Acres	Percent
Cropland	332.1	2.9%
Pasture	72.2	0.6%
Forest	5440.0	47%
Open Wetlands	347.3	3.0%
Gravel Pits, etc.	45.9	0.4$
Open Land	288.4	2.5%
Participation Recreation	302.1	2.6%
Water-based Recreation	2.3	0.o%`
Multi-family Residential	81.6	0.7%
Residential <1/4 acre	34.0	0.3%
Residential ¼ to ½ acre	2732.2	23.6%
Residential >1/2 acre	2732.3	23.6%
Commercial	230.0	2.0%
Industrial	59.7	0.5%
Urban Open Land	159.6	1.4%
Transportation	224.7	1.9%
Waste Disposal	35.5	0.3%
Water	759.6	6.6
Orchard, Nursery, etc.	13.1	0.1%
Total	11576.0	100%

Source: NMCOG with some updates

According to the Massachusetts State and County Data-2002 Census of Agriculture (Vol. 1, Geographic Area Series, Part 21), Middlesex County in which Tyngsborough is located has a significant number of livestock animals in the county inventory. According to the 2002 agricultural census, there were 2,872 cattle and calves present in the county. The most recent available data regarding dairy products (1997) reveals that sales equaled $2,143,000. The county inventory also includes 4,724 hogs and pigs resulting in $662,000 in sales (1997). Middlesex also has a small number of milk and angora goats in the county agricultural inventory.

Boston University Sargent Center for Outdoor Education
Hancock/Peterborough, New Hampshire
Latitude: 42°55'52.38"N
Longitude: 71°59'7.92"W

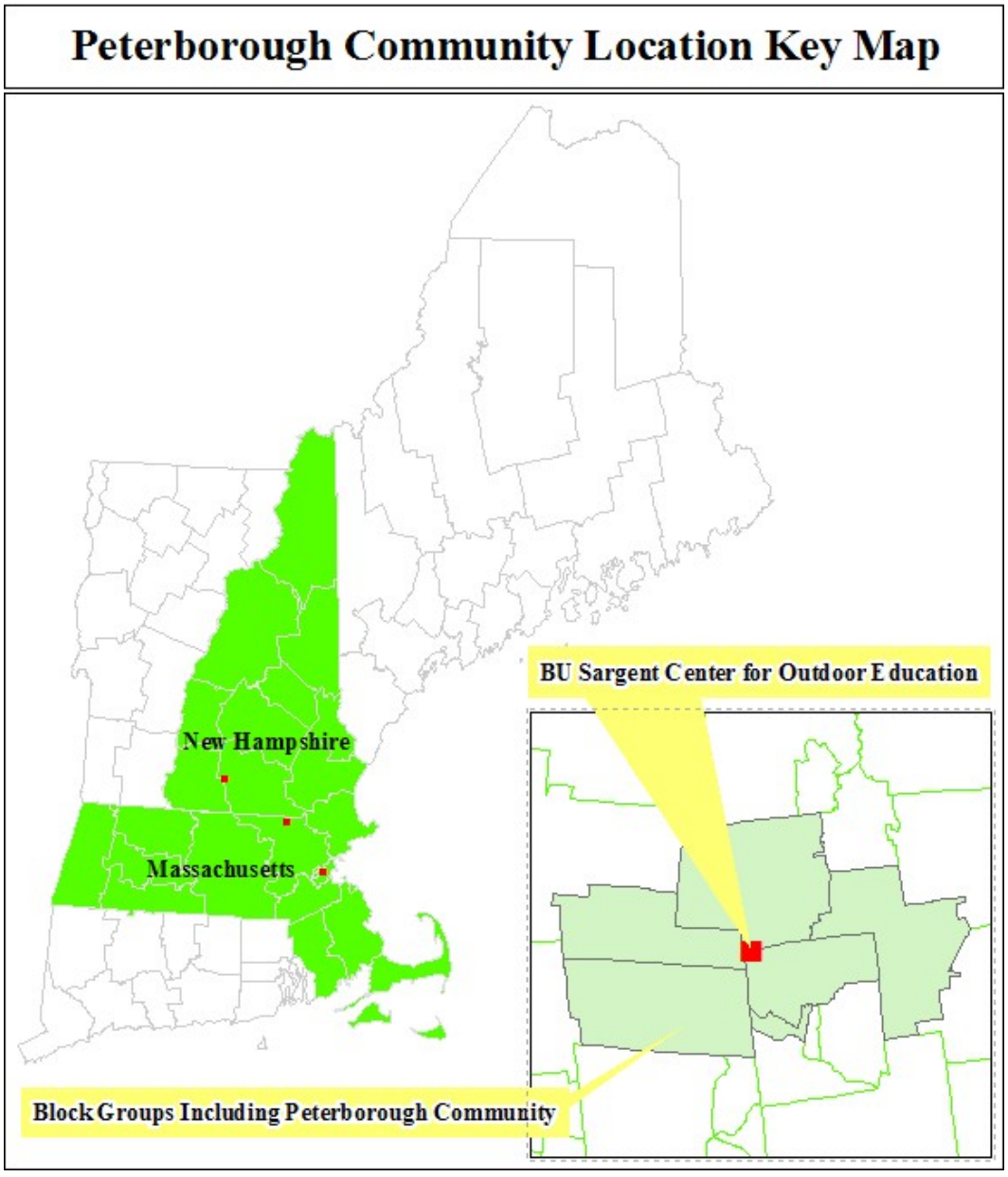

Figure IV-46. Peterborough Community Location Key Map.

Location and Site Description

The Boston University Sargent Center for Outdoor Education (SCOE) is located in Hillsborough County in the scenic Monadnock Region of southwestern New Hampshire. SCOE is bordered on the north by Hancock; northeast by Hunt's Pond and Nubanusit Lake; to the south by West Peterborough and the McDowell Artist Colony; to the southeast by Peterborough, Sheiling Forest and the Wapack Nature and Wildlife Preserve. SCOE is 85 miles from Boston and 125 miles from Hartford, Connecticut and comprises 700 acres of open fields, forested land, streams, wetlands, and a river. There is a 60 acre pond on the site (Halfmoon Pond); a 20 acre open meadow and 22 miles of walking and hiking trails.

The SCOE is used, seven days per week- year round- for team-building and leadership programs, conferences and meetings; an outdoor adventure camp for children ages 10 through 17; an environmental education program for middle school children; and an exchange program for international students. SCOE has a total capacity of 212 persons who stay in a variety of cabins, dormitories, lodges and other quarters on the property. Approximately 10,000 children visit the site each year.

In 1911, Dr. Dudley Allen Sargent purchased a 25 acre farm and established Sargent College of Outdoor Education for Women to provide aquatic and field sports opportunities. In 1932, Boston University purchased the property and added to the holding.

This territory was chartered in 1737 by the Massachusetts legislature, and the first settlers arrived in 1739. The township was probably named from Charles Mordaunt, third Earl of Peterborough. Peterborough was incorporated in 1760 by Governor Benning Wentworth, with continuance for two years only. The incorporation was renewed in 1762, to continue until disallowed by the King. Peterborough had the first free public library supported by taxation, and the first mill in the state that wove cloth mechanically. It is home to the MacDowell Artist Colony, a retreat for writers, artists, and composers. Guests have included Edward Arlington Robinson, Leonard Bernstein, and Thornton Wilder, whose play 'Our Town' was inspired by Peterborough.

The population density in 2005 was 159.8 persons per square mile of land area. Peterborough contains 38.0 square miles of land area and 0.4 square miles of inland water area; however the Monadnock region is replete with rivers, streams, ponds and wetlands. The Boston University Sargent Center for Outdoor Education is located along Sargent Camp Road in Hancock and Peterborough, New Hampshire, approximately 85 miles from downtown Boston.

Peterborough is a town of approximately 6,000 residents and 2,300 households (as of the 2000 US Census). The town has a 3% minority population and a 4% foreign born population. Hancock is a town of approximately 1,700 residents and 700 households. It has a 1.5% minority population and a 1.5% foreign born population. Both towns are

located in Hillsborough County. The nearest city is Manchester, located approximately 27 miles from the site.

The entire site consists of approximately 850 acres, 345 of which are located in the northwest portion of Peterborough and 505 of which are in the southwest portion of Hancock. Approximately 166 acres of the site are non developable with an estimated 24 acres of protected wetlands, 82 acres of protected watershed and a 60 acre pond, Half Moon Pond. Of the 684 remaining acres, the main campus of Sargent Camp, located in the southern portion of the site, occupies a 16-acre parcel. This parcel is improved with a number of buildings including staff and guest housing as well as support lodges and offices containing approximately 59,000 square feet. A Master Plan for the site was developed in October of 2001, which defined the needs of the facility and the programs necessary to serve its primary outdoor educational constituency as well as achieve financial goals. The Master Plan suggested several improvements to the physical plant and creation and expansion of nature trails. The Master Plan did not recommend the development of other uses at the site.

A 330,000 square foot lot area (approximately 7.6 acres) is required for the proposed research facility. The lot size of the Peterborough site is over 800 acres. As the western half of the site consists mainly of protected watershed and wetlands, a location on the eastern half of the site was selected as the optimal location for the facility at the site. A location just east of Windy Row Road on the southern portion of the campus was selected. Construction of a new facility at this particular location would cause minimal disruption to existing uses at the site and surrounding open spaces and natural areas. Construction at this location would also conform to one of the principles of the site management plan: to buffer between conflicting program or service and support areas to minimize the impact. The site is already serviced by roadways and has relatively flat topography. The site would be set back by more than 150 feet from existing roadways.

The SCOE site is located within the town limits of Peterborough. The portion of Peterborough in which the site is located is zoned as a Rural District. Uses allowed by right include residential (single family and two family), recreational, agriculture, farm, forestry, public utility, and educational. Uses allowed by special permit of the Board of Adjustment include manufactured housing, churches, day care facilities, and the removal of fill, gravel, stone, sand, and loam. Biological research is not permitted at the site. Rezoning of the site to allow a biological research use would require the approval from the town.

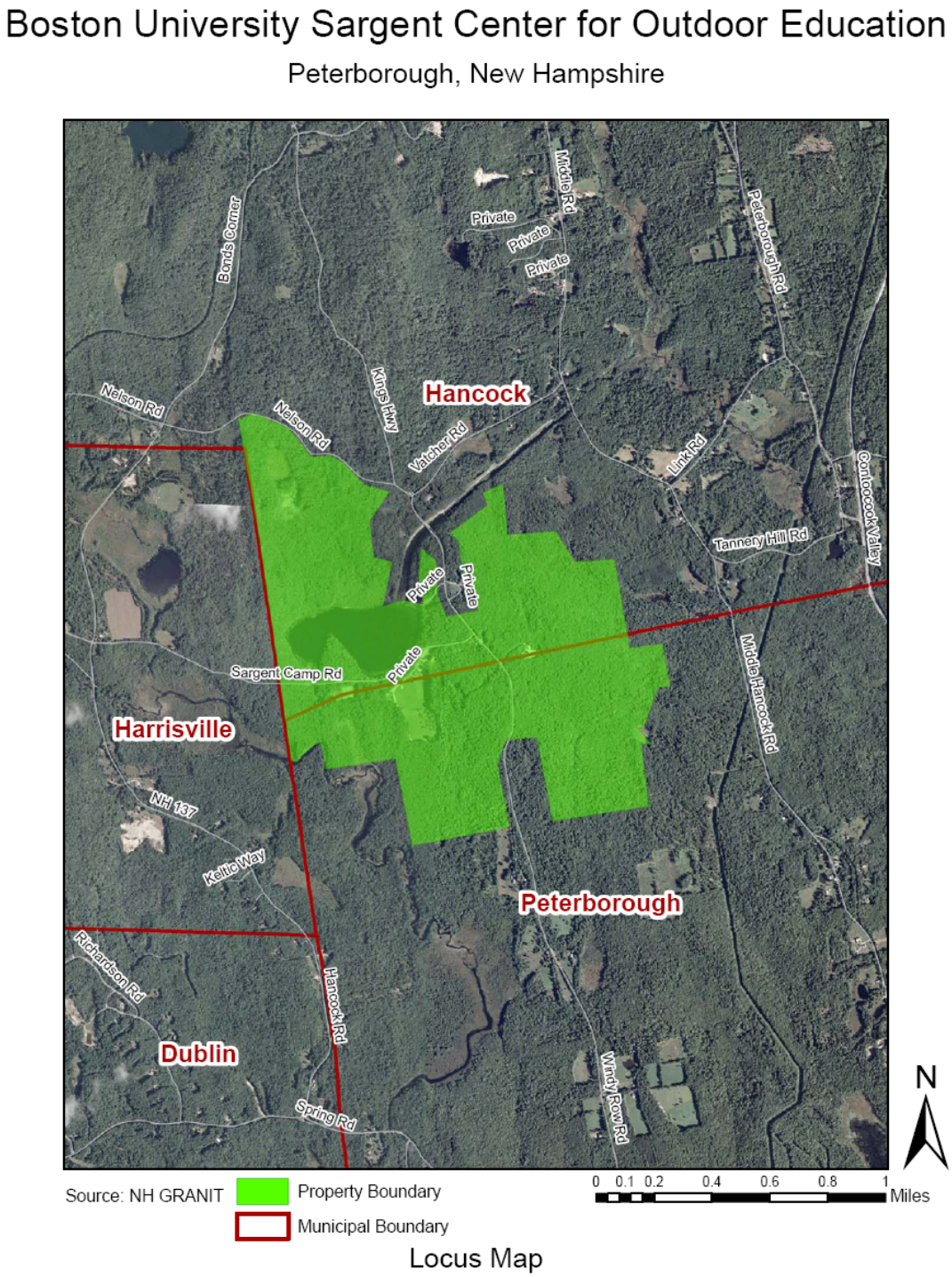

Figure IV-47. Boundary map for the Sargent Center for Outdoor Education property.

Figure IV-48. View of the SCOE main campus.

Figure IV-49. View of the SCOE main campus.

Figure IV-50. Yurt Village: The Shire. This is an educational camping venue at the SCOE

Visual Quality

The alternative NEIDL site at the SCOE is comprised of 700 acres of open fields, forested land, streams, wetlands, and a river. There is a 60 acre pond on the site (Halfmoon Pond); a 20 acre open meadow and 22 miles of walking and hiking trails. The site is surrounded by farming and pasture land. Development of the site to accommodate the NEIDL will impact the visual quality of the site and surrounding areas.

Figure IV-51. Camp Sargent Road approaching SCOE

Figure IV-52. The SCOE is adjacent to farm and pasture land.

Figure IV-53. Adjacent Pasture Land

Figure IV-54. Nearby Livestock

Figure IV-55. Adjacent Agricultural Property

Figure IV-56. Adjacent Agricultural Property

Figure IV-57. Typical Buildings on SCOE Property

Historical Resources

Table IV-8 identifies the structures listed in the National Registry of Historic Places that are found in Peterborough. The map in Figure IV-58 identifies more historic resources in the Peterborough vicinity.

Table IV-8. Structures found in Peterborough that are listed in the National Registry of Historic Places.

Name	Location	Date Listed
All Saints' Church	51 Concord St.	1980-12-01
MacDowell Colony	W of US 202	1966-10-15
Peterborough Unitarian Church	Main and Summer Sts.	1973-04
US Post Office - Main	23 Grove St.	1986-07-17

In addition, there is an on-going effort by the Peterborough Historical Society to inventory properties in the Peterborough area. There are three properties in South Peterborough that may be eligible for Registry and three proposed historical districts, including the Old Jaffery Road and Street Road areas. There are two anchor properties in these areas that are eligible for Registry; the Morrison Homestead (Terrace Hill) and the New Mill property (the mill itself).

The SCOE is not located near any of the historic resources in the area and therefore construction of the NEIDL on the SCOE property would not impact them.

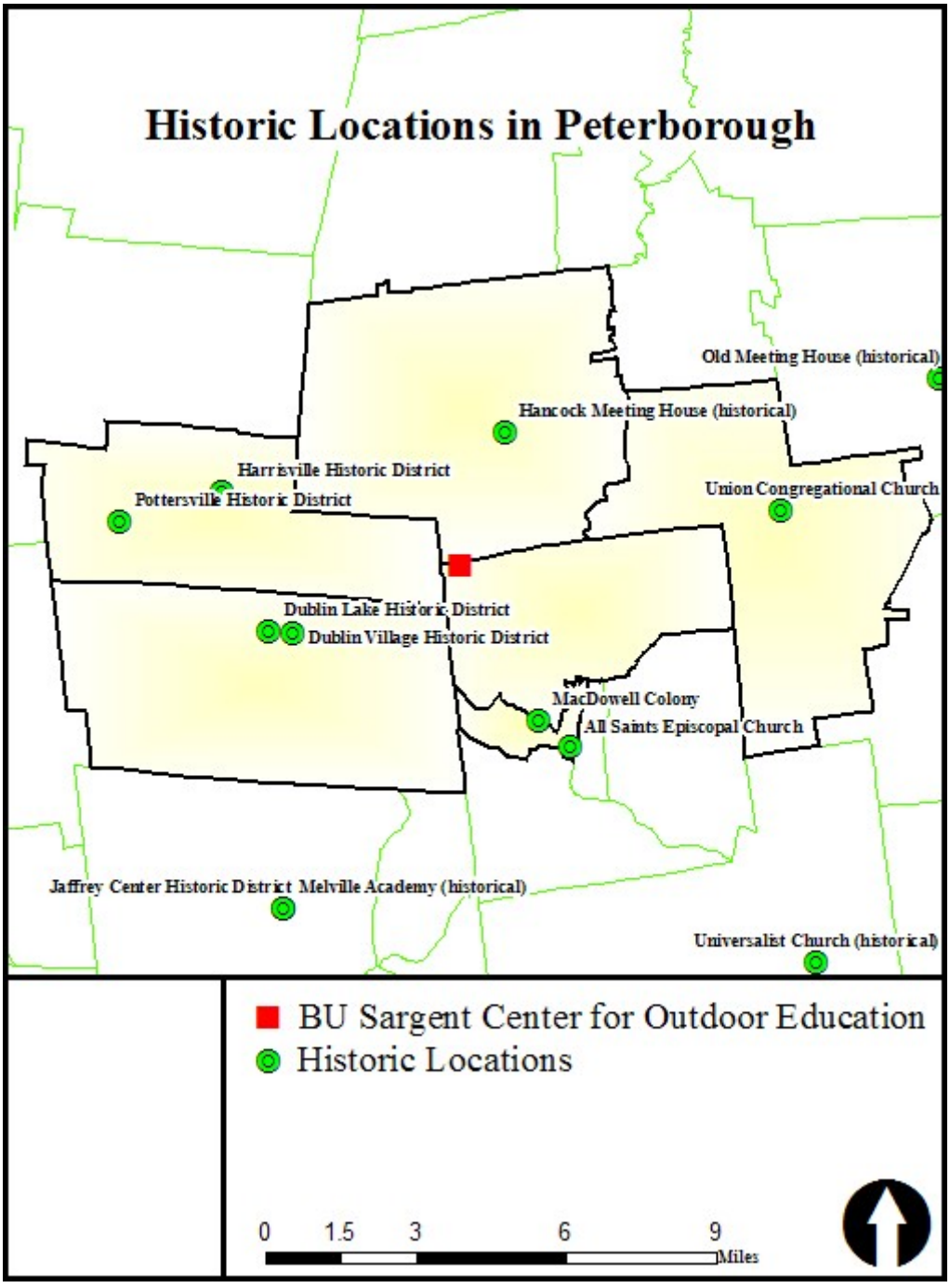

Figure IV-58. Map shows locations of historic resources throughout the Peterborough area.

Noise

The state of New Hampshire does not have regulations that set community noise exposure criteria. It is up to each individual community to establish noise regulations through community by-laws. Peterborough zoning ordinance (§245-33) prohibits on-site activities that will result in sound levels that commonly exceed the background levels by more than 10 decibels or exceed the ambient level at any time by more than 15 decibels. Sound not discernible with normal human hearing two hundred (200) feet beyond a point on the boundary of the premises is presumed not to exceed the ambient level by more than 10 decibels at that point. Vehicles parked on the premises and idling are subject to this standard, but traffic on streets is not. Construction and operation of the NEIDL on the alternative SCOE site would exceed the current background levels of noise by more that 10 dBA.

Utilities

Electric power is provided by Northeastern Utilities; two diesel-fired back-up generators (150 kW each); one for the north circle and for the south circle are provided for back up power because power failure is fairly routine in the area. Heat is provided by a combination of liquid propane gas and fuel oil, both stored underground. On-site well water provided via wells from an aquifer running under the property and septic fields and a sewage lagoon complete the utilities. The Town of Peterborough does have a municipal sewage collection and treatment system; however, the SCOE is not served by the sewerage system and is more than three miles away at its closest point. Peterborough has a public water distribution system, but it does not serve the SCOE site. It would be cost prohibitive to attempt to build a three mile hook-up to the public water system.

Economically, it would not be feasible to build a laboratory in an area lacking this basic service to handle the substantial volume of industrial wastewater that would be produced. The wastewater treatment plant would need to undergo extensive upgrades to accommodate this new capacity. Additional costs would be incurred to tie the SCOE site into the Peterborough water supply.

Fueling the operations of a laboratory at this location would be a challenge. The site currently does not tie into natural gas lines. Large scale above ground storage tanks would be required to fuel all operations. Due to the shallow water table, underground storage tanks would not be a feasible option.

Figure IV-59 Sewage Lagoon serving the SCOE

Transportation and Access

Road access to the area is somewhat limited to US Route 202 and State Routes 101, 123, and 136. The nearest interstate routes are Everett Turnpike and I-89, 27 and 33 miles away, respectively. Access from the west is via a dirt road. The University encourages traffic to arrive from the east; however, this road is an unlined country road with no shoulder. Access to the site is by a rural unpaved road that will not currently support the needs of a large biomedical research facility.

The existing road infrastructure will not support the types and volume of construction, operational, and service related traffic that would be required to construct the NEIDL and then operate it. The impact would be a higher volume of construction traffic on this unlined road. Improvement to the roads so that the NEIDL could be supported would change the character of these local roads for area residents and increase traffic significantly. The SCOE currently receives complaints about buses bringing groups to the site; construction and vehicular traffic would increase the volume of large vehicles on this road further impacting the residents adjacent to the property.

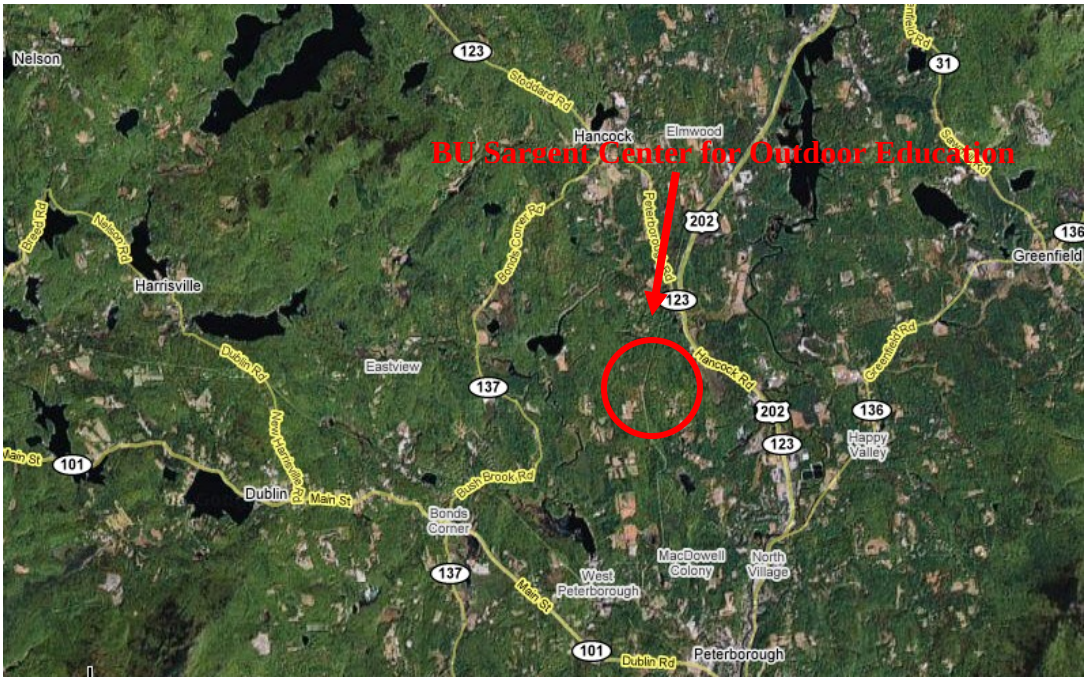

Figure IV-60. Road Access to the Peterborough SCOE Site.

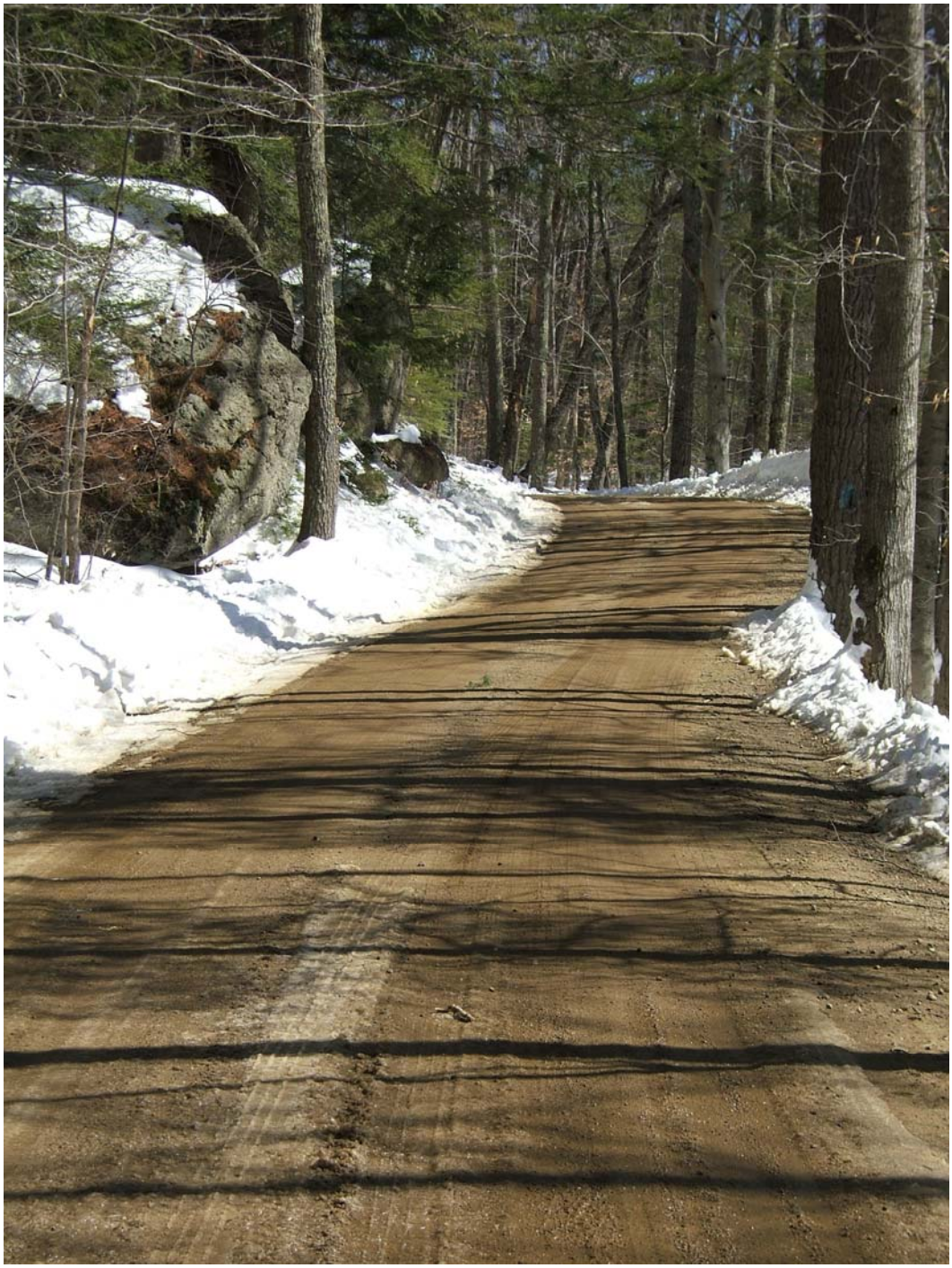

Figure IV-61. Dirt road approaching the SCOE campus from the west.

Figure IV-62. Unlined, country road with no shoulder approaching SCOE campus from the east.

There is no railroad or public transportation available near the site.

The Peterborough area, and particularly the SCOE, site do not have rail, road or other transportation options sufficient to support a large biomedical research facility.

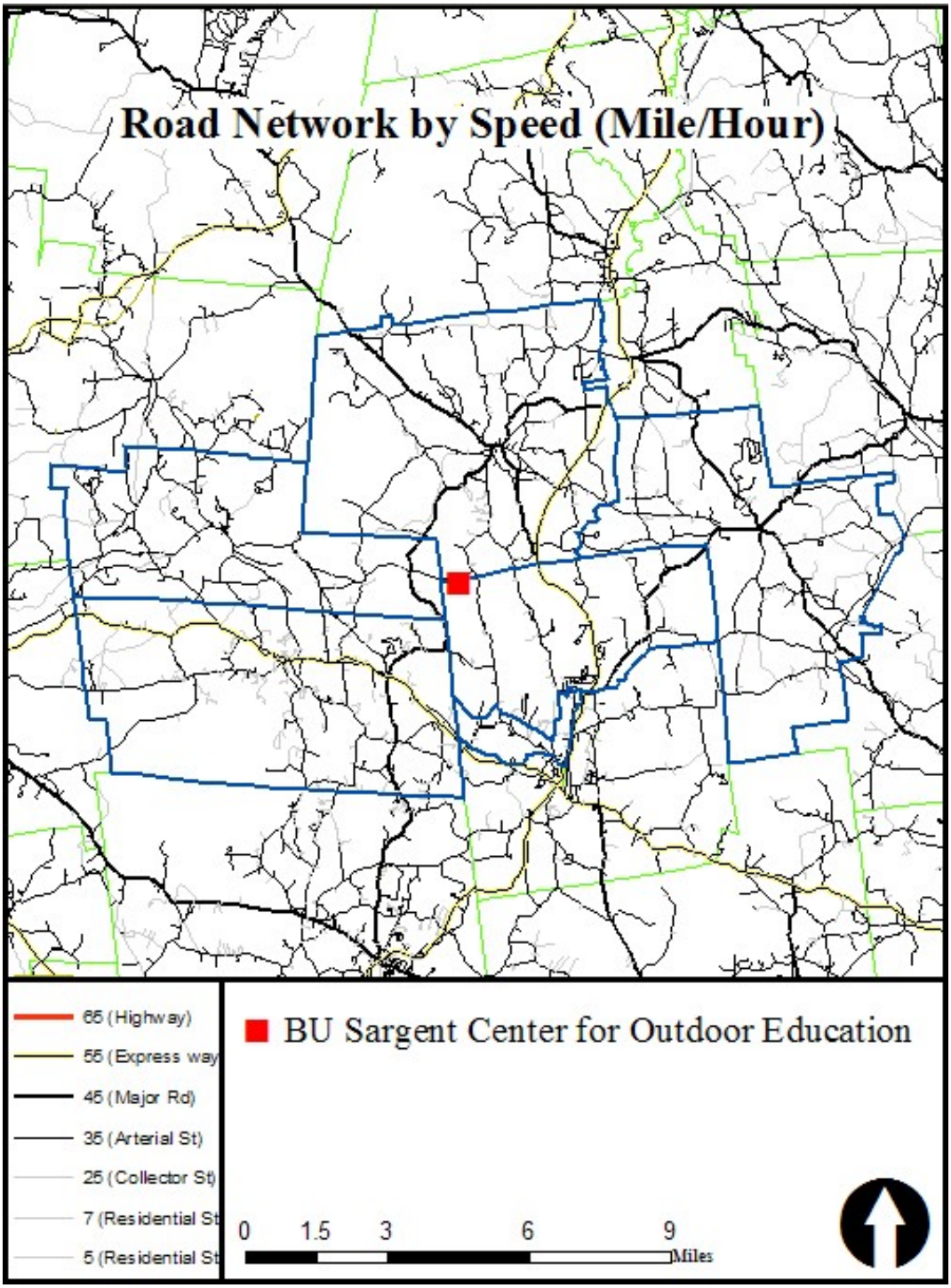

Figure IV-62. Map shows the network of roads surrounding the SCOE. There is no immediate access to a highway or expressway.

Air Quality

Peterborough is located in Hillsborough County, New Hampshire and is located approximately 85 miles from the city of Boston, Massachusetts. The state of New Hampshire currently has 4 counties which are in moderate non-attainment for the 8 hour ozone standard. Hillsborough County, where Peterborough is located, is one of the 4 counties listed as being in moderate non-attainment (www.epa.gov/air/data).

Hillsborough County is classified by the EPA for terms of hazardous air pollutant production as an urban area. According to the EPA Hillsborough County produces approximately 10,500,000 pounds of hazardous air pollutant emissions per year. This amount of hazardous air emissions is approximately 22% of New Hampshire's annual hazardous air pollutant emissions.

If the NEIDL were to be sited in Peterborough, New Hampshire it would be reasonable to expect that there would be impacts to the immediate air quality of Peterborough and Hillsborough County. Hillsborough County is currently in moderate non-attainment for the 8 hour ozone standard. If the facility were to be sited in Peterborough this would lead to a substantial increase in car and truck traffic to Peterborough. The facility is anticipating approximately 660 permanent positions in the facility and approximately 1,300 temporary construction jobs to be created. It is reasonably expected that the majority of these positions would be filled by people living in the immediate area of Boston. If the facility were to be sited in Peterborough there would be a highly substantial addition of people driving to Peterborough from the Boston area. Considering that almost half of ozone causing pollutants in urban areas comes from cars, buses, trucks, and other construction vehicles it could be assumed that would be a substantial increase in ozone production and possibly drive the county into a severe non-attainment status. Also, with the new amounts of traffic that would be generated in the Peterborough area it would be possible that a substantial increase in carbon dioxide emissions would be experienced. Currently the county is in attainment for carbon dioxide but an increase of this magnitude could change the status based on the amounts and duration of vehicle traffic in the area.

Economics, Income and Demographics

Peterborough is well known for its publishing industry including MacGraw-Hill, IDG and Yankee magazine. The other major industries are New Hampshire Ball Bearing, Peterborough Basket Company, Eastern Mountain Sports and the Millard Group. Peterborough is also well known for the performing arts such as the McDowell Colony, the Peterborough Players and the New England Marionettes.

The population for the Block Group in which the SCOE is located is 1747; of which 1444 are white. No Blacks reside in this BG; 9 individuals who identify themselves as being of mixed race; 42 Hispanic/Latinos and 67 Asians reside in the BG where SCOE is located. None of the BGs in this area of consideration qualify for an environmental justice

determination based on either race or income. The BGs also do not house a significant number of foreign-born individuals.

The public schools in Petersborough are part of the Contoocook Valley School District and collectively serve approximately 1826 students. Additionally, there are two parochial schools serving Peterborough. See Table IV-9.

The nearest community/technical college is New Hampshire Community/Technical College--Peterborough, Monadnock Region Center and the nearest colleges/universities are Franklin Pearce College, Keene State University, and Antioch University-New England.

Table IV-9. School enrollment in Peterborough, NH.

School	Number of Schools	Grades Served	Enrollment	Vocational Education
Elementary	1	K-4	348	
Middle/Junior High	1	5-8	559	
High School	1	9-12	919	Yes
Private/Parochial	2	K-9	125	

With respect to education, Peterborough claims a well-educated workforce with many individuals who have four-year college degrees or higher,

Figures IV-63 through 66 provide information regarding the distribution of selected population demographics across the BGs surrounding the SCOE site.

Table IV-9 shows income statistics for Peterborough. Of the families living in Peterborough, 6.4% have incomes at or below the poverty level.

Table IV-10. Annual incomes of residents of Peterborough, NH according to the 1999 U.S. Census.

Type of Income	Income
Per capita income	$26,154
Median 4-person family income	$54,375
Median household income	$47,381
Median Earnings, full-time, year-round workers	
Male	$42,178
Female	$27,422

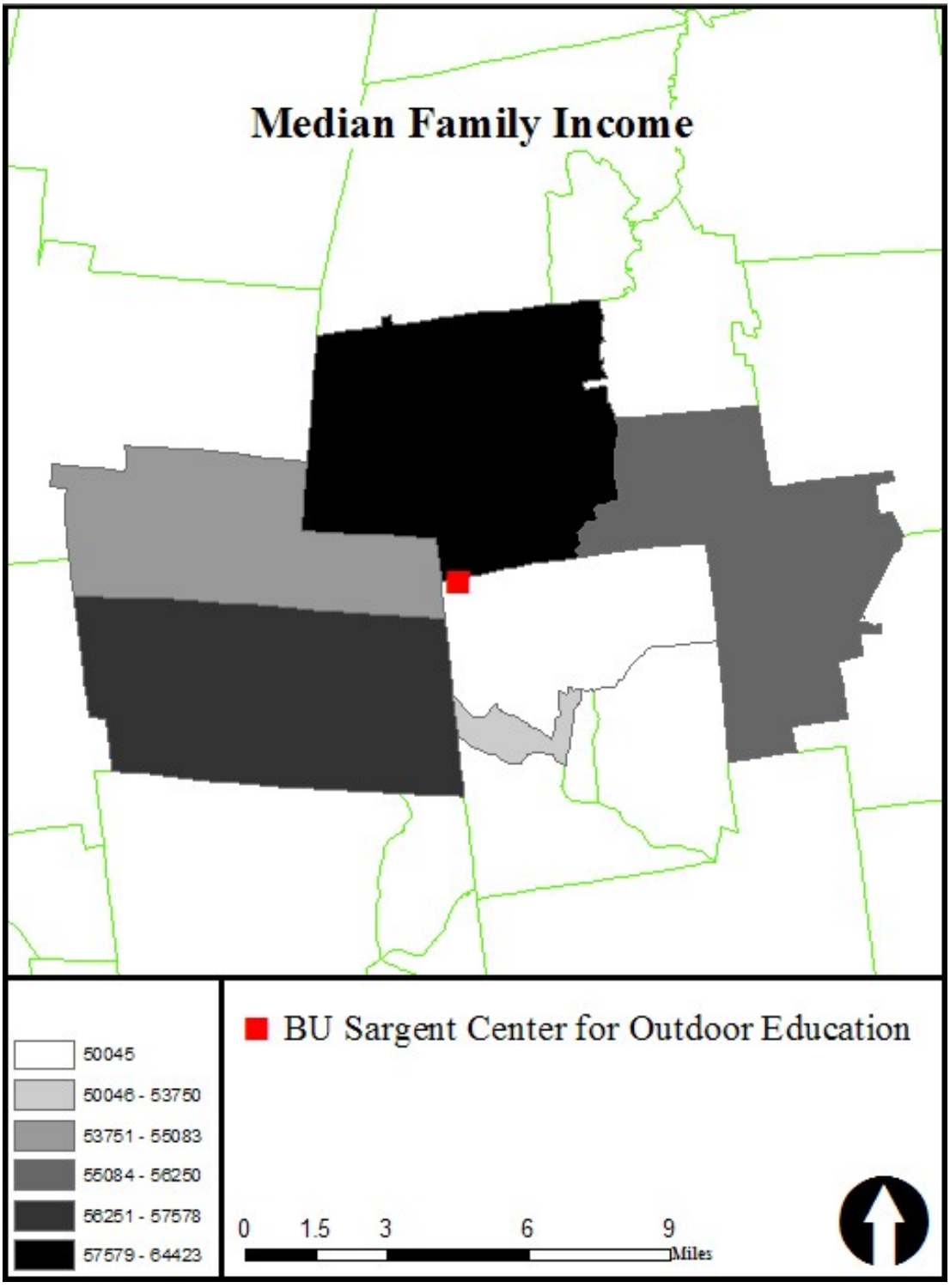

Figure IV-63. Median Family Income in Peterborough, NH.

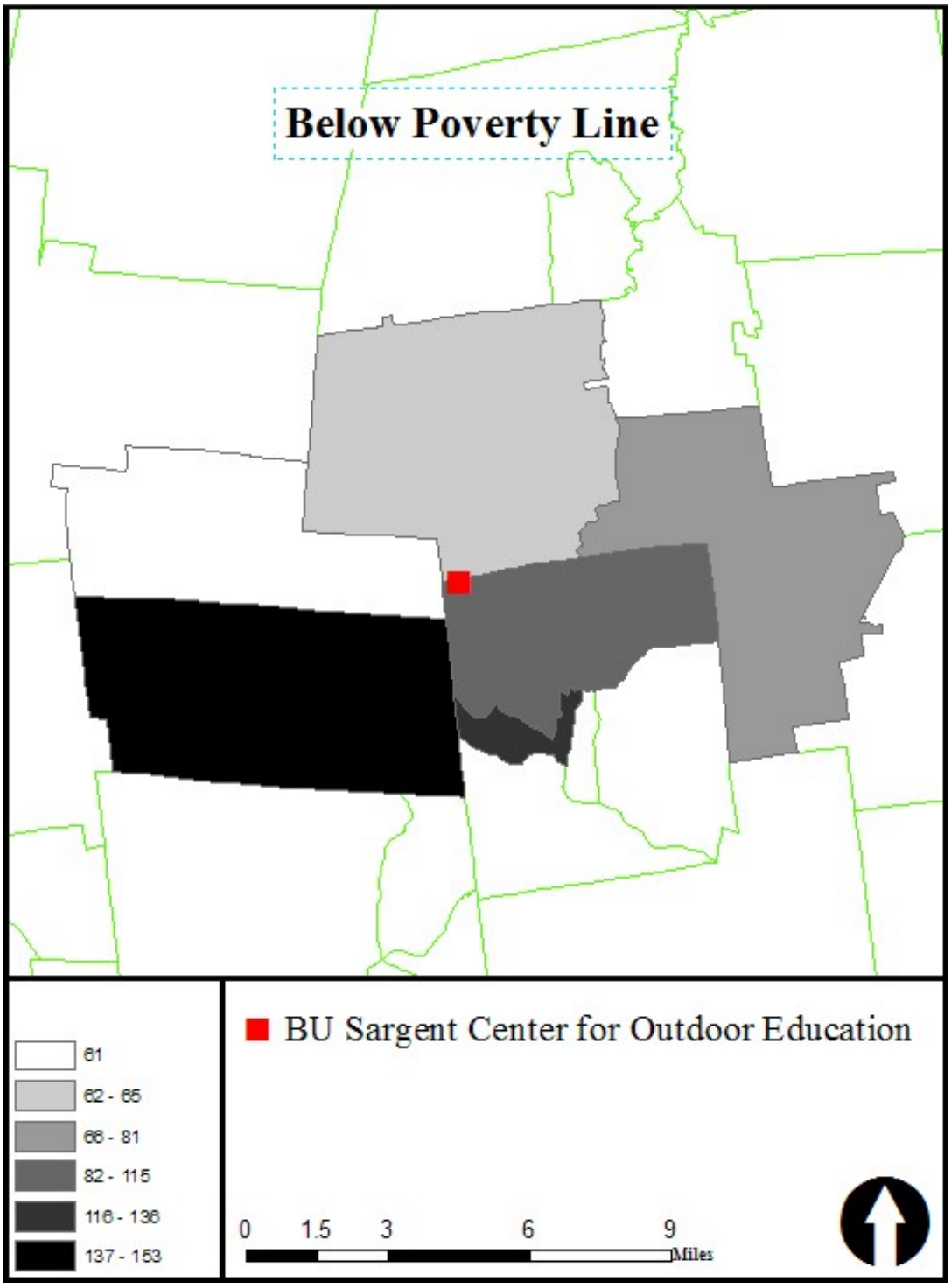

Figure IV-64. Distribution of individuals having incomes at or below the poverty level in Peterborough, NH.

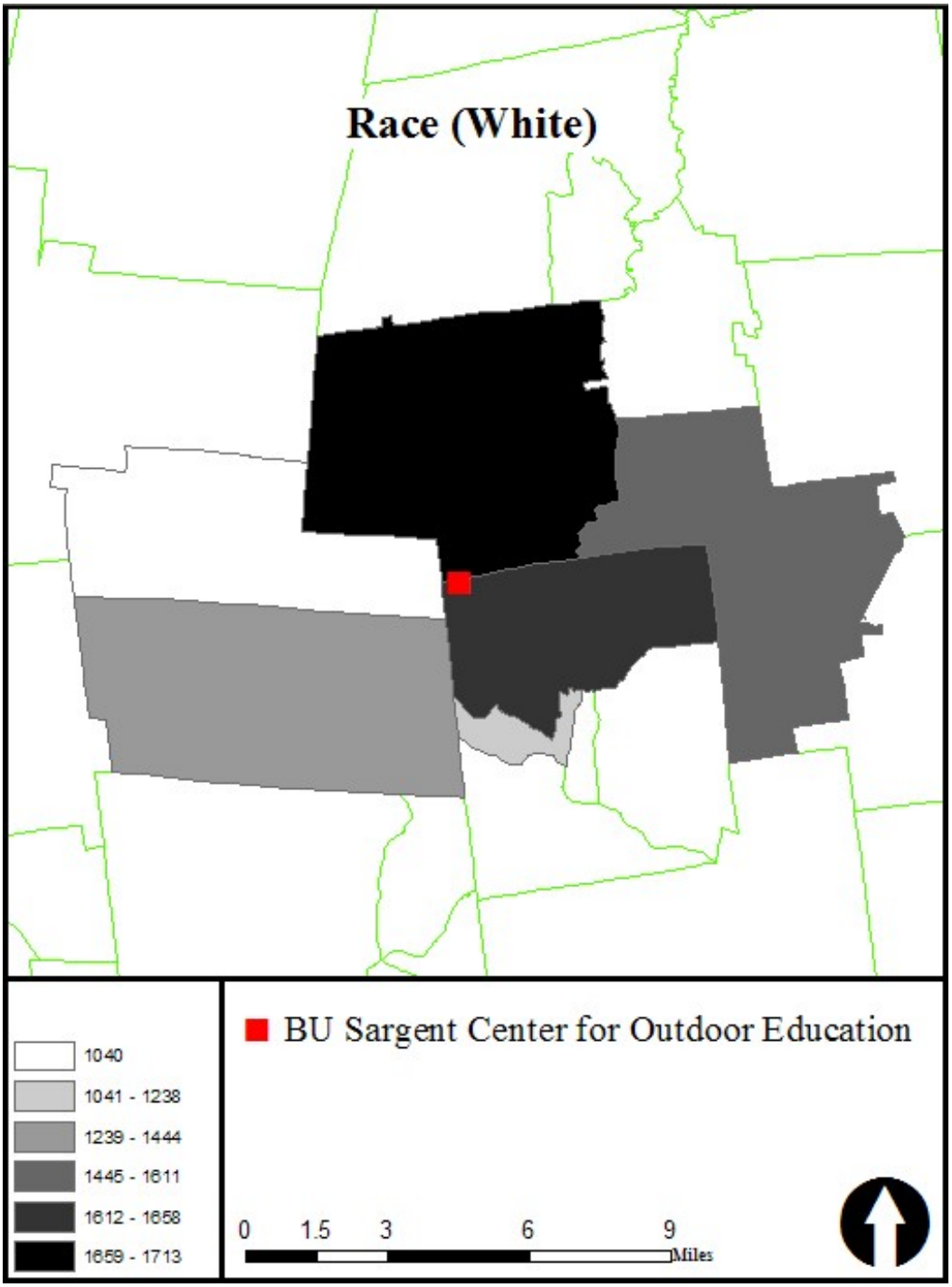

Figure IV-65. Distribution of individuals considering themselves White in Peterborough.

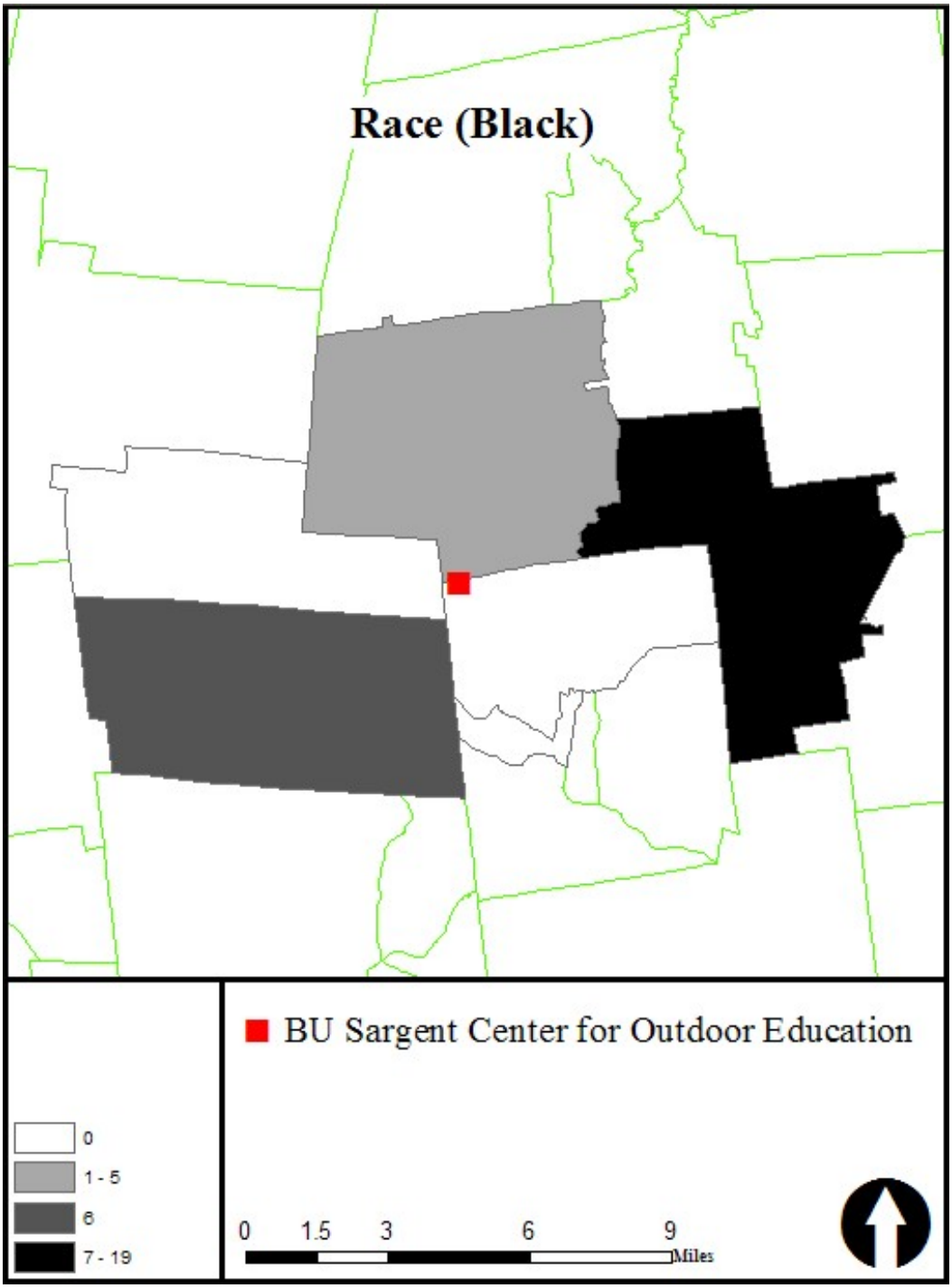

Figure IV-66. Distribution of individuals considering themselves to be Black in Peterborough.

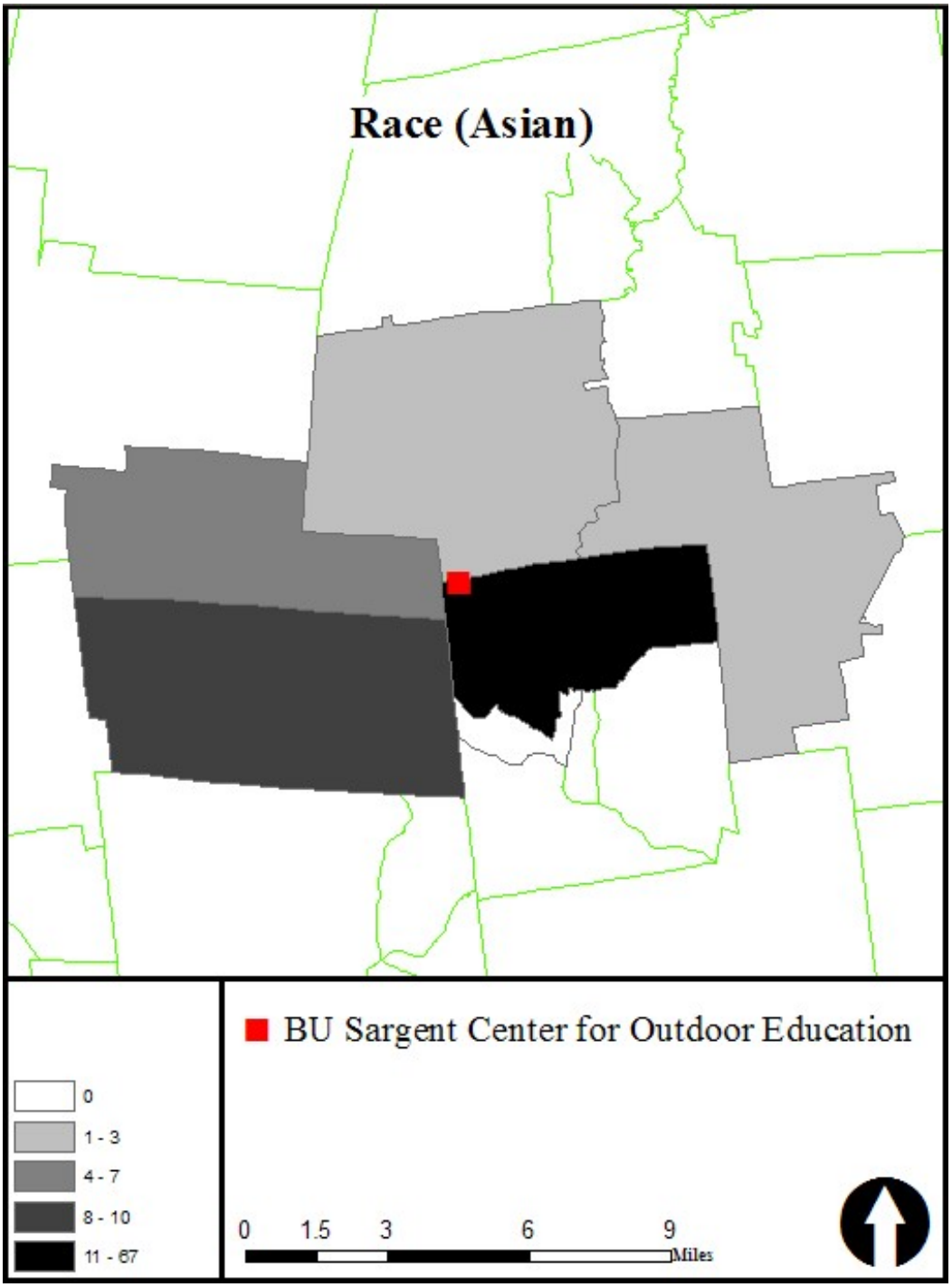

Figure IV-67. Distribution of individuals considering themselves to be Asian in Peterborough.

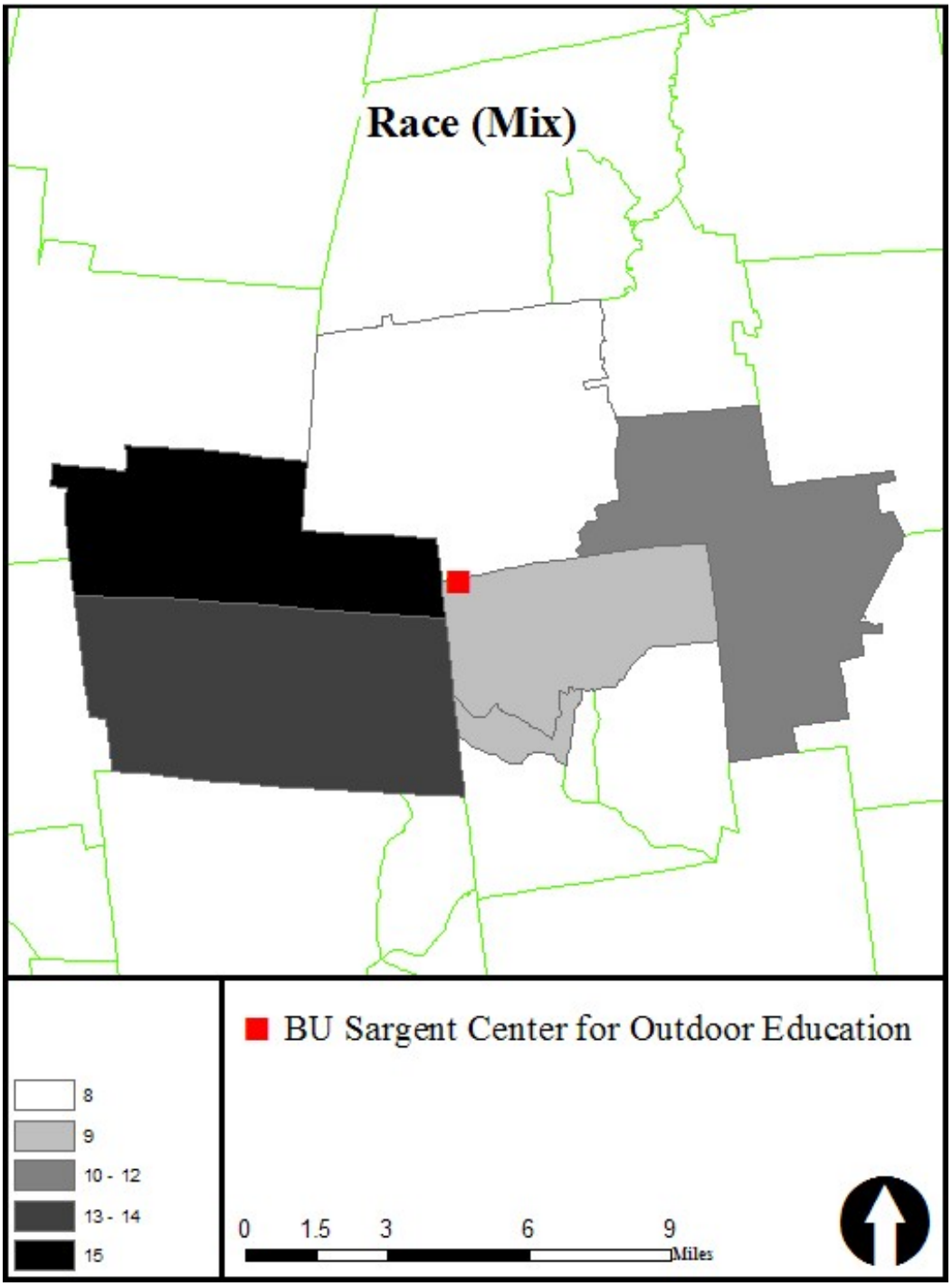

Figure IV-68. Distribution of individuals considering themselves of mixed race in Peterborough.

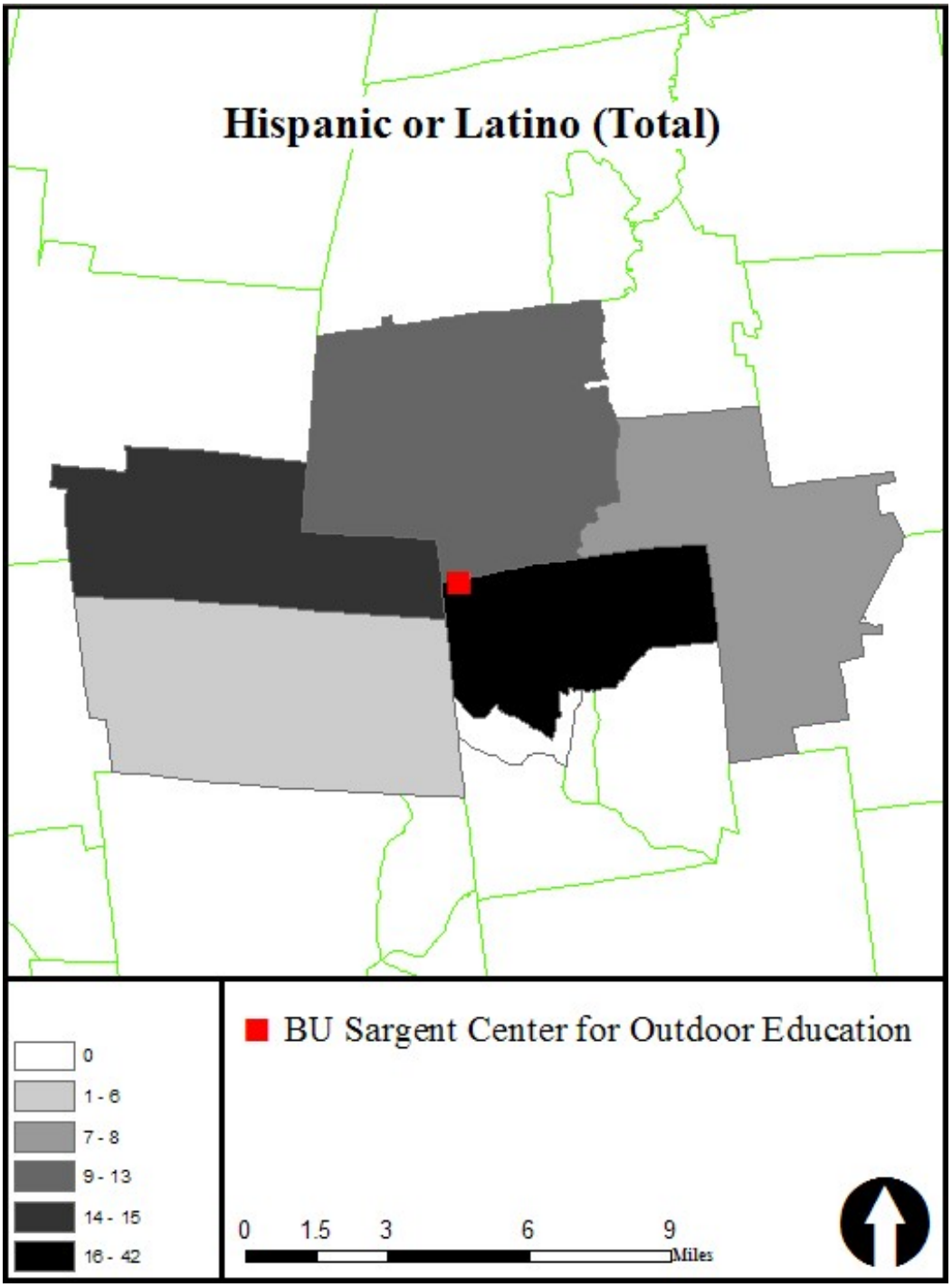

Figure IV-69. Distribution of individuals considering themselves Hispanic/Latino in Peterborough.

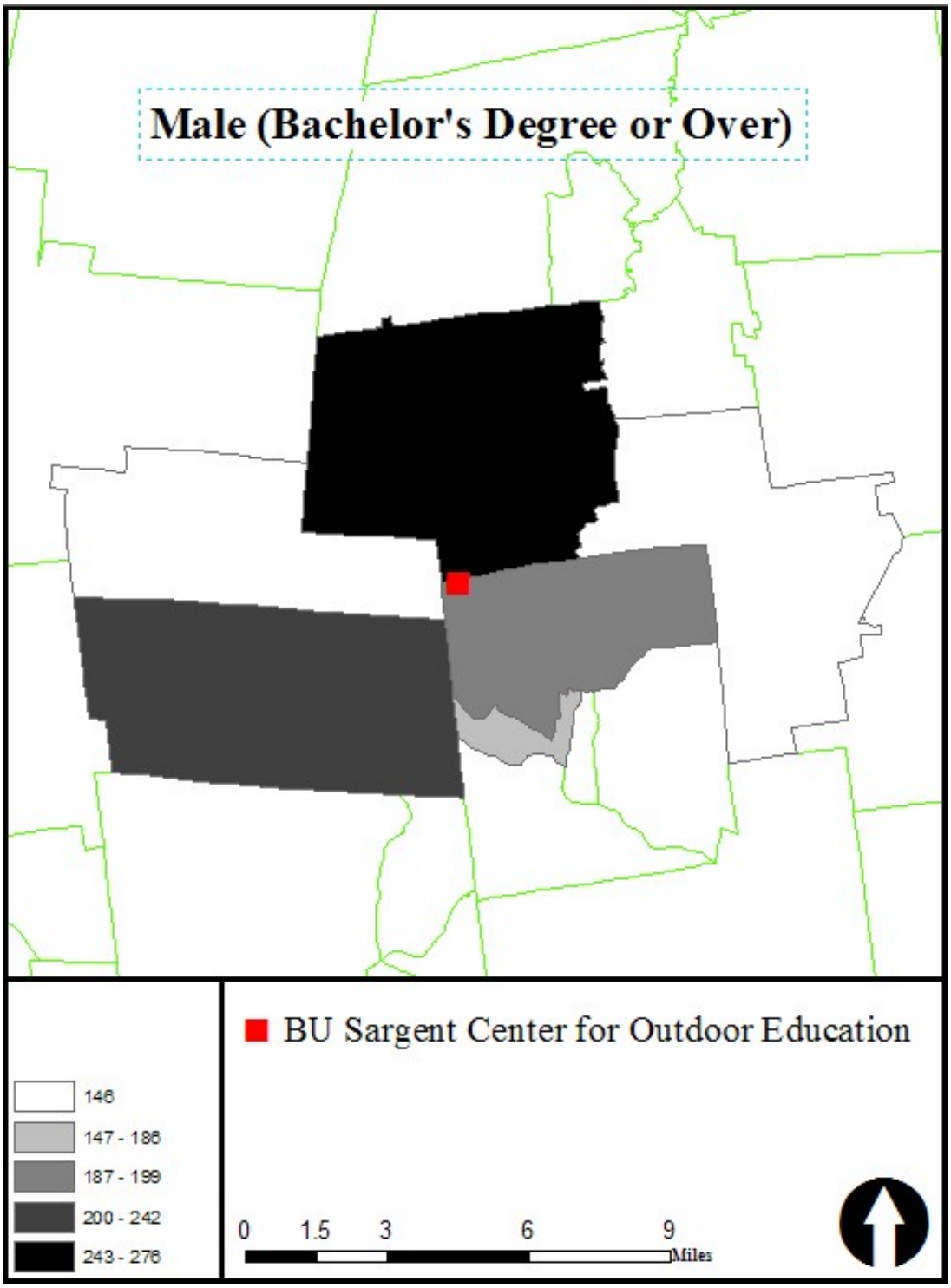

Figure IV-70. Number of Males having a four-year college degree (or higher) in Peterborough, NH.

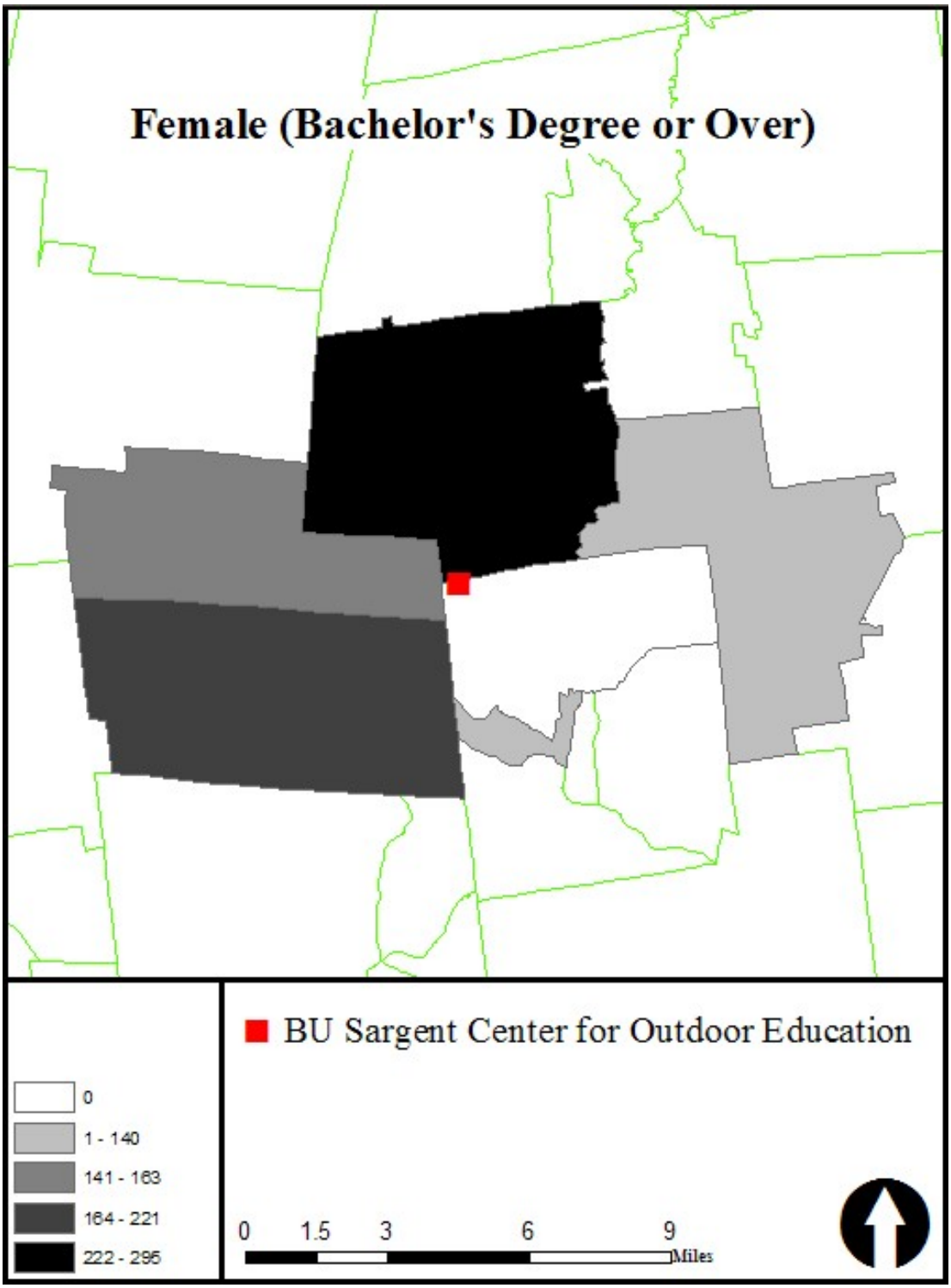

Figure IV-71. Number of Females having a four-year college degree (or higher) in Peterborough, NH.

Healthcare Facilities, Social Assistance and Emergency Response

The town of Peterborough has only three full time administrative employees; a Town Administrator, Assistant Administrator, and Town Clerk. The Town has a volunteer fire and rescue service department with only one full-time employee. The Peterborough fire station is located a 4.8 mile (13 minute) drive southeast of the site. The Hancock fire station is located a 3.9 mile (9 minute) drive north of the site. The town has twelve fulltime police officers. The local Board of Health is made up of volunteers who may not necessarily be trained to address health and safety issues associated with a research facility. The nearest medical facility is Monadnock Community Hospital in Peterborough, a 7.4 mile (14 minute) drive from the proposed site.

Monadnock Community Hospital

Monadnock Community Hospital (MCH) at 452 Old Street Road, is a 25 bed acute care facility (licensed for 62 beds) including four ICU beds, seven obstetrical and 14 medical-surgical beds, respectively. MCH is the primary care facility for thirteen surrounding towns and serves a total population of approximately 36,000. The large majority of patients are medicare patients; many people in the surrounding area are either self-employed or employed by small businesses and do not have other health insurance.

Figure IV-72. Monadnock Community Hospital is a 25 bed acute care hospital serving Peterborough and twelve other towns.

The MCH Emergency Department (ED) offers health services 24 hours a day, 7 days a week to patients of all ages with all presenting complaints. The Emergency Department is responsible for the immediate treatment of any medical or surgical emergency; for initiating life saving procedures in all types of emergency situations; and for providing emergency and initial evaluations and treatment for other conditions including minor illnesses and injuries, and subacute medical problems. After initial assessment and stabilization, patients are transported to other medical institutions if necessary. The ED services about 12,000 patients per year, most of which are primary care visits. It has two trauma rooms with two beds each and one of the other rooms is balanced to have inward airflow. Decontamination showers are available at the ED and the MCH has a decontamination trailer and a heliport with room for a second. The hospital has an Emergency Response Plan that was developed in conjunction with Town Administrators and operates under the Hospital Incident Command System (HICS).

In the event of the need to transport a patient to a tertiary care facility, either the Monadnock Emergency Medical Services or the Dartmouth-Hitchcock Advanced Response Team (DHART) would be used. The DHART is based in Lebanon, at Dartmouth-Hitchcock Medical Center, New Hampshire's only verified Level 1 Trauma Center. DHART crews provide both ground and air medical transportation services to the medical communities of Northern New England. In addition, DHART flight crews respond to public safety agency requests for medical evacuation of trauma patients from scenes of injury, and will transport to the closest Trauma Center in the region's five states. University of Massachusetts-Worcester helicopters may also be utilized. Boston University Medical Center is 1 ½ hours away by ground transport or 35-40 minutes by helicopter. Transport decisions are based on the case urgency and prevailing weather patterns. Under severe weather conditions, transportation of an ill NEIDL worker would be problematic.

The MCH Medical Staff includes over 125 primary and specialty care physicians, 15 dentists and 23 health professional affiliates. Medical Staff offices are located in the Medical Arts Building on MCH's campus as well as in the communities of Peterborough, Jaffrey, Antrim and New Ipswich. One hundred percent of the Medical Staff are Board Certified in their specialty area. However there are no infectious disease specialists at MCH. An infectious diseases specialist consults as necessary by telephone. A pathologist is available two days per week in the clinical laboratory.

Monadnock Community Hospital is not accredited by the Joint Commission for Accreditation of Healthcare Organizations (JCAHO). The hospital is accredited as "Critical Access" through the Centers for Medicare and Medicaid Services (CMS, formerly HCFA).

Floodplains

Peterborough is one of the most flood-prone areas in the state and has been included in three disaster declarations since 1987. It is subject to a variety of natural hazards

including riverine flooding, wildfires, ice storms and river ice jams. The town has more than forty dams, two of which have been classified as high hazard dams. Specifically, the SCOE property is encompassed by a Special Flood Hazard Area (SFHA) designated as Zone A, a 100 year floodplain.
The site is adjacent to easements to the Army Corps of Engineers and to the spillway for the MacDowell Lake. In the event of an emergency, the spillway can be opened to prevent the town of Peterborough from flooding. See Figures IV-73-76.

Figure IV-73. The Edward MacDowell Lake Spillway is adjacent to the SCOE site.

Figure IV-74. View from the Edward MacDowell Lake Spillway

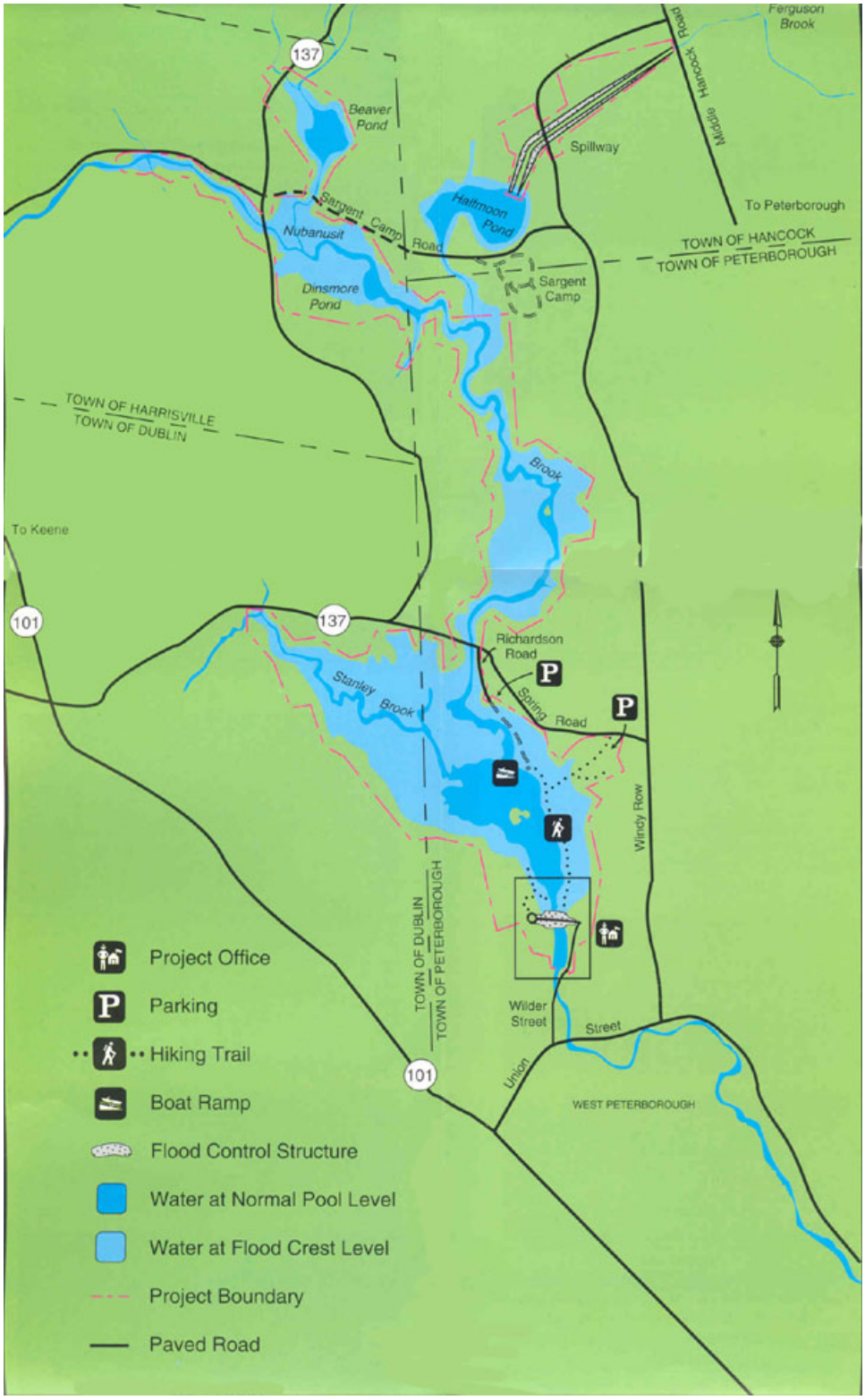

Figure IV-75. Peterborough Area Floodplain Map

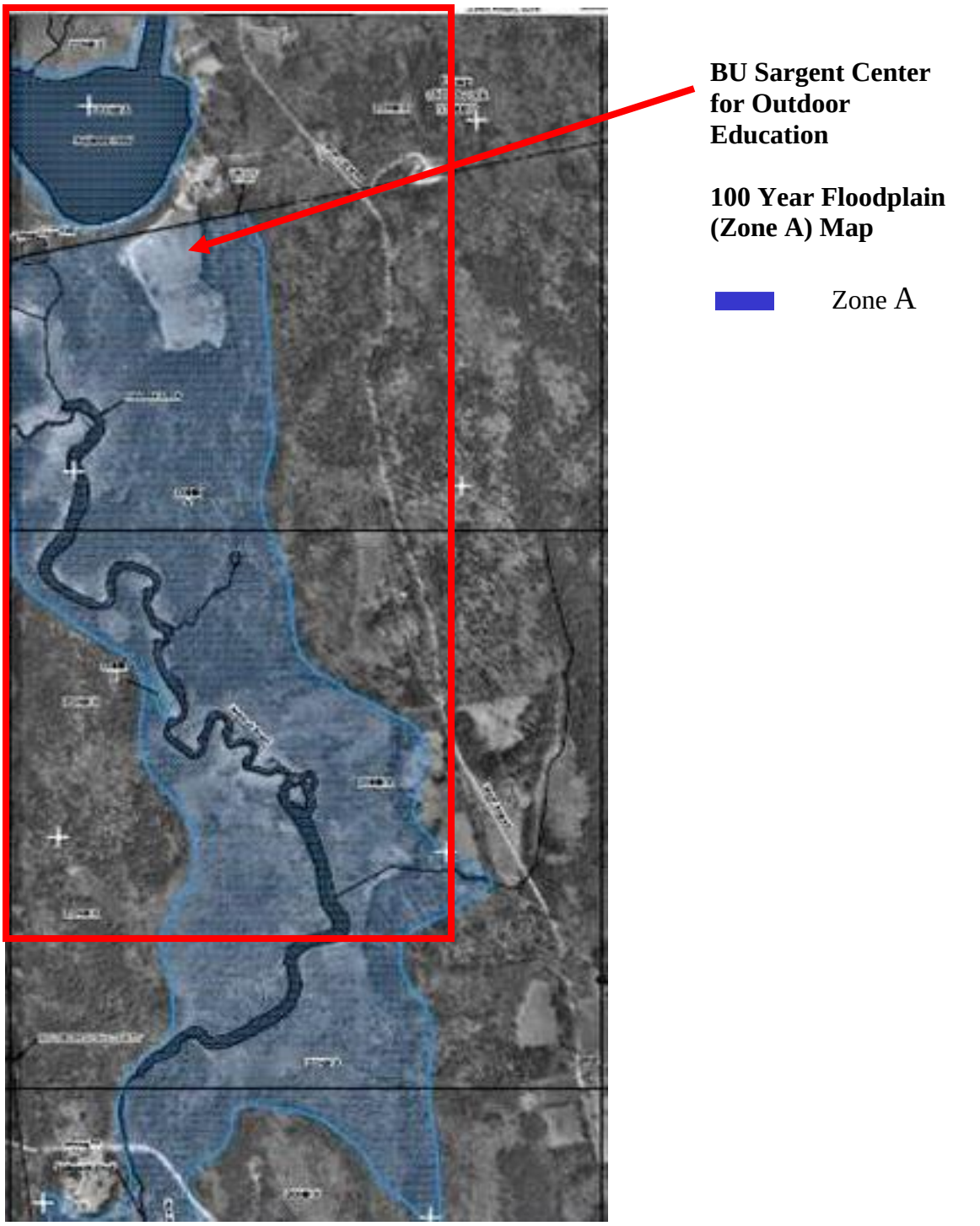

Figure IV-76. Satellite imaging of floodplains surrounding the SCOE property. Source: Panel 0286_6000, New Hampshire FIRM
http://msc.fema.gov/webapp/wcs/stores/servlet/CategoryDisplay?catalogId=10001&storeId=10001&categoryId=12001&langId=-1&userType=G&type=1&dfirmCatId=12009

Peterborough has joined the disaster-resistant efforts of the Federal Emergency Management Agency's Project Impact, a national effort to change the way disasters are handled. This effort shifts the focus of emergency management from responding to disasters to taking actions in advance of disasters that reduce potential damage. Peterborough has adopted a strict floodplain management program and introduced intensive community growth management efforts, including planning for open space and conservation areas as a Project Impact disaster-resistant community.

In accordance with Executive Order 11988 – Floodplain Management, May 24, 1977, 42 F.R. 26951, the agency shall consider alternatives to avoid adverse effects and incompatible development in the floodplains

Wetlands, Riparian Areas and Surface Waters

Peterborough is situated in the Contoocook River corridor and is replete with numerous streams, lakes, great ponds, and wetlands. (See Figures IV-75-76 and IV-77-78) The Contoocook River is unique in that it flows north-northeasterly, a feature that made it an important travel corridor in pre-Colonial times. Features of interest include areas of rapids in Hillsborough and West Henniker and sand deposits which indicate presence of a lake bed in the valley during the times of glacial activity.

Geologic resources of the river corridor include Pleistocene and Quaternary sand and gravel deposits. These deposits form the most productive aquifers in the region. A 1986 study in Peterborough found that most of the significant aquifers in that town were near the Contoocook River.

Peterborough, and specifically the SCOE, is surrounded by a variety of wetland types including emergent freshwater wetlands; freshwater forested/shrub wetlands; freshwater ponds; and lakes (See Figure IV-79). Wetlands are found throughout the SCOE and notably ring the developed portion of the site, the Sargent Center. In the main campus the water table ranges from 0 (wetlands) to approximately 7 feet.

The DHHS General Administration Manual defines wetlands as those areas inundated or saturated by surface water or ground water at a frequency and duration sufficient to support and, that under normal circumstances do support a prevalence of vegetation or aquatic life that require such conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs and similar areas.

Executive Order 1190, Protection of Wetlands, 42 CFR2691 (1977) as amended by Executive Order 12608, 52 F 34617 (1987) and U.S. Code 4321 direct federal agencies to minimize destruction, loss or degradation of wetlands in carrying out program responsibilities. The SCOE is located in an undeveloped area with numerous surface water bodies and wetland areas in the immediate vicinity (Figures IV-79 through 81).

Figure IV-77. Half Moon Pond looking North

Figure IV-78. The Nubanusit Brook as viewed from SCOE hiking trails

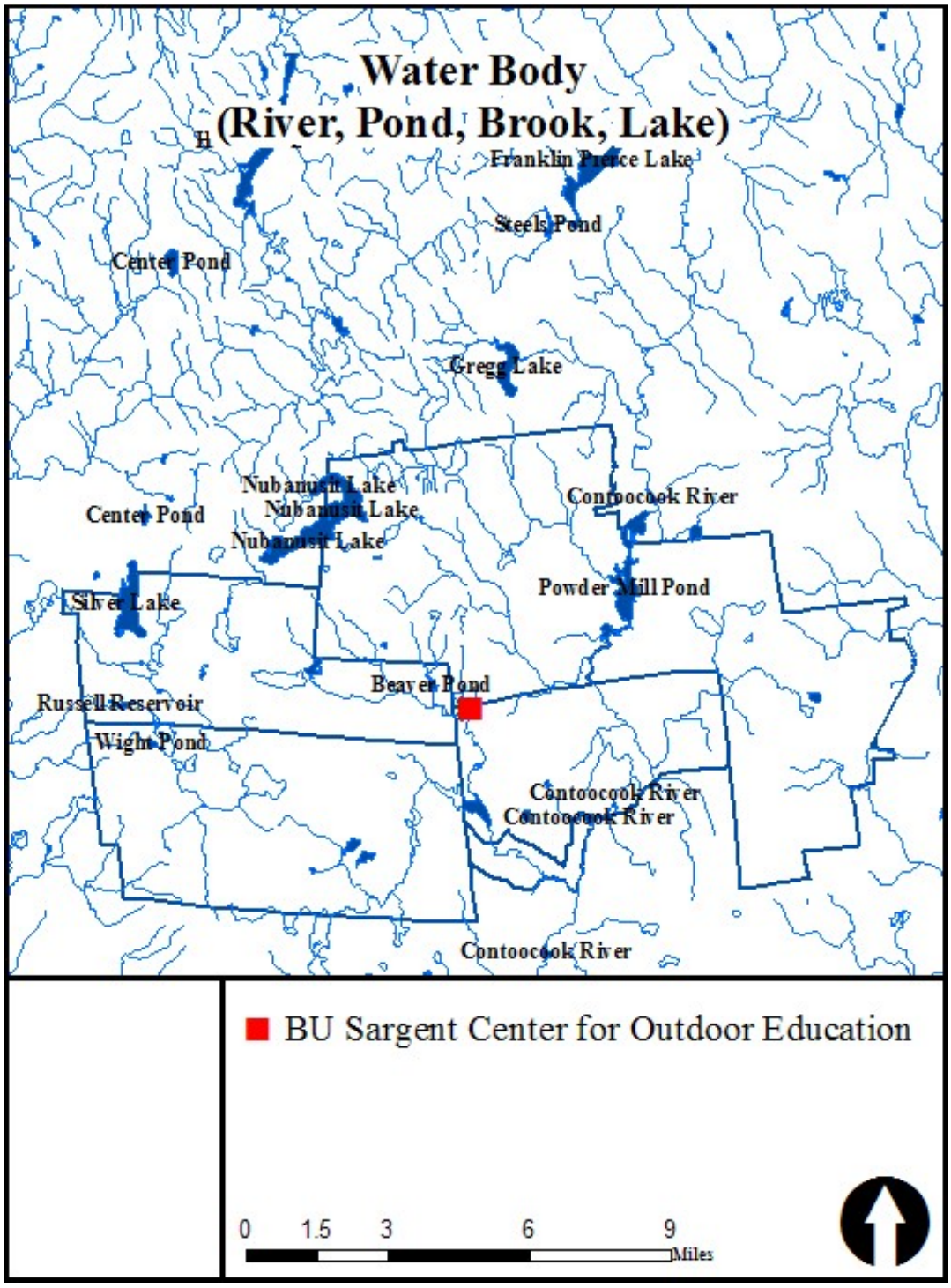

Figure IV-79. The waterbody network surrounding the SCOE site.
Source: Geographic Data Portals – Download Data – Census 2000 TIGER/Line Data – Line Features – Hydrography
http://www.esri.com/data/download/census2000_tigerline/index.html

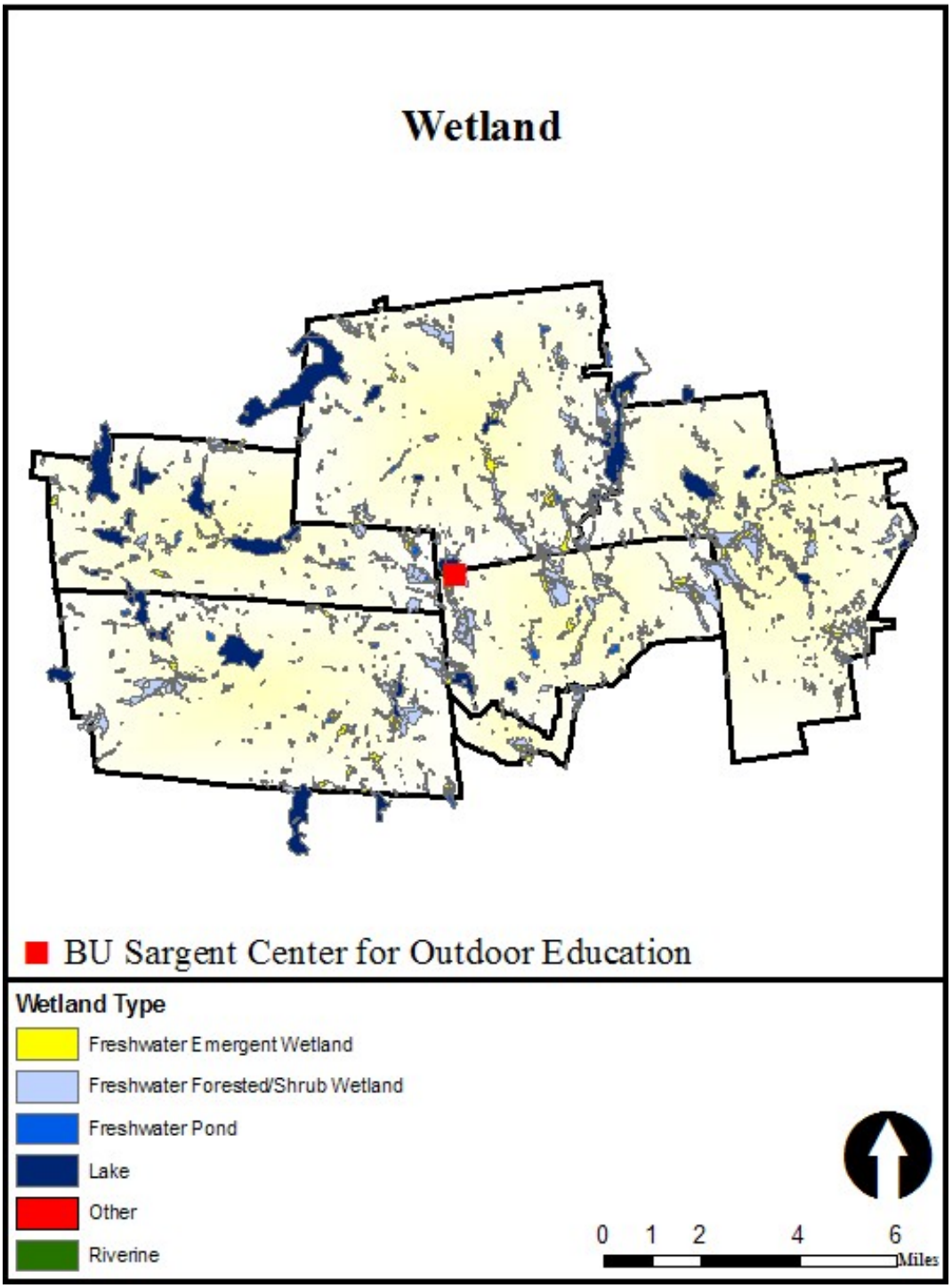

Figure IV-80. Map shows wetlands that surround the SCOE, by type.

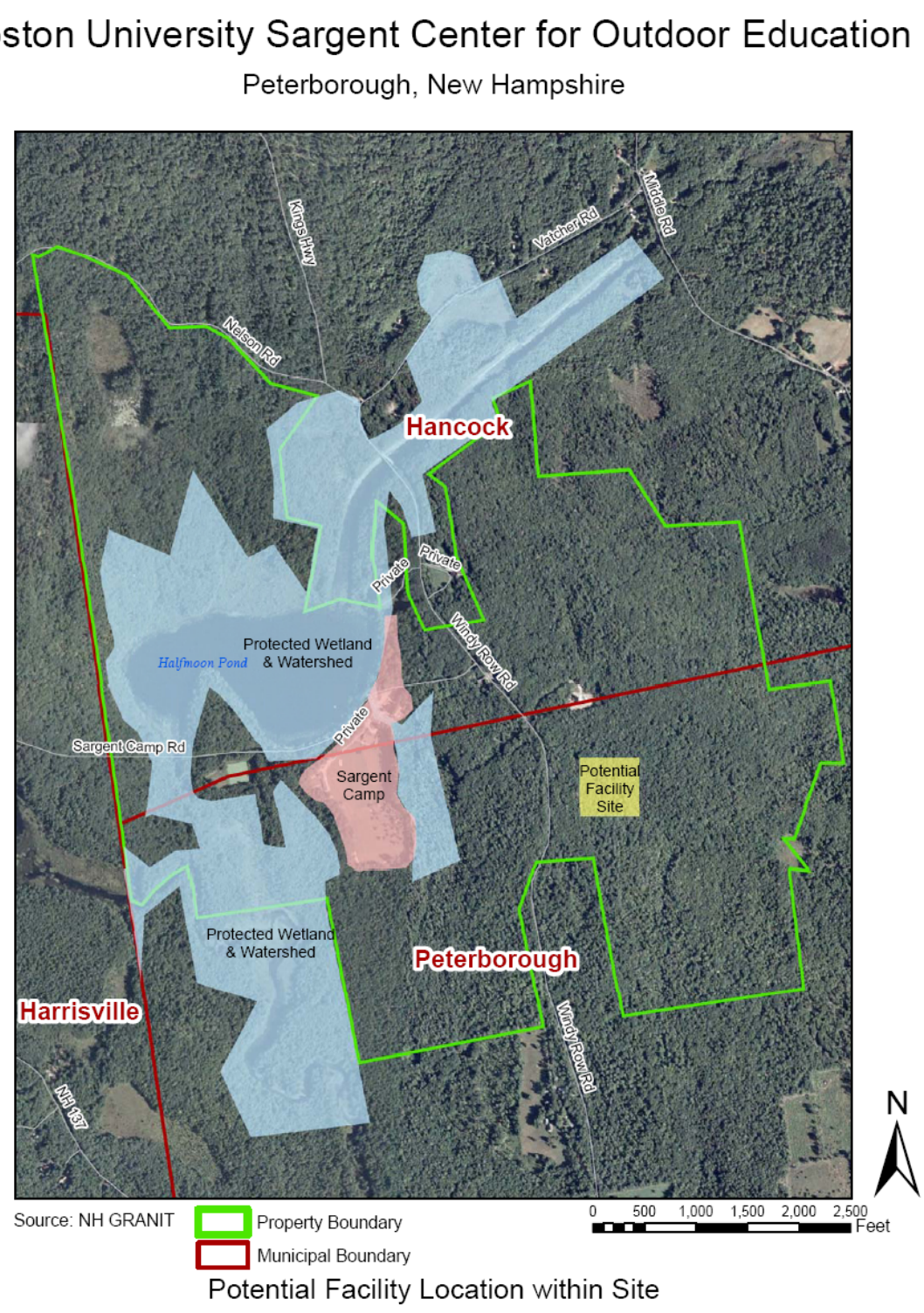

Figure IV-81. Potential facility site in relation to the SCOE camp and protected wetlands and watersheds.

Habitat, Vegetation and Wildlife: Regional and Site-specific

Regional

The SCOE site is located in the Quabbin to Cardigan Conservation Collaborative (Q2C) region, an area encompassing 3,000 square miles in NH and MA. This collaborative endeavors to protect large tracts of forested land that are threatened by increasing growth and industry in this region. The goals of the Collaborative include preventing fragmentation of habitat in order to protect and promote interconnectedness of large tracts of undeveloped land for the wildlife and migratory birds that depend on it. There are many private and public agencies involved in this effort. Public partners to the Collaborative include:

Franklin Regional Council of Governments (MA)
Mass. Dept. of Fish and Game
Mass. Dept. of Conservation and Recreation
Montachusett Regional Planning Commission (MA)
NH Division of Forests and Lands
NH Fish and Game Dept.
Southwest Regional Planning Commission (NH)
U.S. Fish and Wildlife Service

Leaving the SCOE in its current state and minimizing development would best promote the goals of the Q2C.

Vegetation

The following plant species can be found within the Contoocook River corridor in which SCOE is located.

Trees

White Pine	Hemlock	Oak species
Ash Species	Poplar	American Elm
White Birch	Gray Birch	Yellow Birch
Sweet Birch	Maple species	American Beech
Hop Hornbeam (Ironwood)	Atlantic White Cedar	Hickory species
Tulip Poplar	Poplar Alder	Sweetgum
Basswood	Black Gum	Cherry species
Dogwood species	Eastern Larch	Hawthorn
Eastern Redcedar	Linden	Locust species
Norway Spruce	Scotch Pine	Sassafras
Serviceberry	Sycamore	Witch-hazel
Staghorn Sumac	Douglasfir	Aspen
Pussy Willow		

Shrubs

Nannyberry
Highbush Blueberry
Arrowwood
Gray Dogwood
Yew species
Buttonbush
Rosebay Rhododendron
Arrowwood
Mapleleaf Viburnum
Juniper species
Blackberry
Spicebush
Highbush Cranberry
Winterberry
Red-osier Dogwood
Mountain Laurel
Black and Red
Raspberry
Winterberry

Herbaceous Plants

Yellow Hawkweed
Bluet
Cow Vetch
Milkweed
Shepard's Purse
Pipsissewa
Wintergreen
Bedstraw
Cardinal Flower
Goldenrod
Starflower
Canada Mayflower
Nodding Trillium
Royal Fern
Interrupted Fern
Common Speedwell
Ragweed
Sheep Sorrel
Timothy
White Campion
Bluebead Lilly
Partridge Berry
Blue Flag
Buttercup
Fringed Polygala
Stonecrop
May Apple
Bracken Fern
Wood Fern
Marginal Fern
Anne's Lace
Common Cinquefoil
Poison Ivy
Red Clover
Bristly Sasparilla
Pink Ladyslipper
Bunch Berry
Indian Cucumber
False Climbing
Buckwheat
Common Blue Violet
Solomon's Seal
Celandine Poppy
Sensitive Fern
Cinnamon Fern

Aquatic Vegetation

Cattails
Arrow arum
Lilypads
Sedges
Pickerelweed
Sweetflag
Bulrushes
Pondweed

Fish. The following fish species are known to inhabit the Contoocook and North Branch Rivers.

Brook Trout	Rainbow Trout	Brown Trout
Fallfish	Chain Pickerel	Atlantic Salmon fry and parr
Largemouth Bass	Smallmouth Bass	
Yellow Perch	Walleye	White Perch
Pumpkinseed	Longnose Dace	Redbreast Sunfish
Blacknose Dace	Common Shiner	Common White Sucker
Eel	Johnny Darter	Banded Sunfish

The rivers generally have clean water and good pH and dissolved oxygen levels for trout habitat. The most significant high quality habitat area for cold water fish species is the rapids in the Hillsborough/West Hopkinton area. This area is used as a nursery for stocked Atlantic Salmon fry, and also provides a good habitat for trout. The fast moving sections of river in Jaffrey and Peterborough also provide good trout habitat. The North Branch is stocked by the NH Fish and Game Department.

Viable warm water fish habitat is found in the slower moving impoundment areas. These would include Powder Mill Pond with the river above it as well as the river section between Contoocook Village and The Island. Warm water fish populations are natural. The Contoocook River is a vital component of the Merrimack River Watershed Anadromous Fish Restoration Program initiated in 1969. At present, there is no upstream passage for fish above the Amoskeag Dam in Manchester, but plans call for future fish passage facilities to allow for movement as far as the Hopkinton-Everett flood control dam. Anadromous species making use of the passage facilities would include Alewife, Atlantic Salmon, and Shad.

Wildlife

The following wildlife species are known to inhabit the Contoocook and North Branch Rivers areas and/or similar habitats in the central/southwestern area of New Hampshire.

Mammals. The following animal species can be found in the Peterborough area.

Deer Mouse Masked Shrew
White-footed Mouse
Red-backed Mouse
Field Mouse
Meadow Vole
Pine Vole
Smokey Shrew
Short Tailed Shrew
House Mouse
Norway Rat
Meadow Jumping Mouse
Eastern Chipmunk
Little Brown Bat
Woodland Jumping Mouse
Silver-haired Bat
Red Bat
Eastern Long-eared Brown Bat
Hoary Bat
Big Brown Bat
Gray Opossum
Star-nosed Mole
Hairy-tailed Mole
Squirrel
Raccoon
Bobcat
Black Bear
Red Squirrel
Muskrat
Southern Flying Squirrel
Beaver
Fisher
Northern Flying Squirrel
Woodchuck
Porcupine
Short-eared Weasel
Common Mink
River Otter
Eastern Long-tailed
Weasel
Striped Skunk
Snowshoe Hare
New England Cottontail
Red Fox
Grey Fox
Coyote
Moose
White Tailed Deer

Birds. The varied habitats along the Contoocook and North Branch Rivers support almost any bird species found in southern New Hampshire. Many species of waterfowl use the river as a migratory stop in the spring and fall. The following species can be found in the Contoocook and North Branch River corridors.

Great Blue Heron
Belted Kingfisher
Green-backed Heron
American Bittern
Least Bittern
Alder Flycatcher
Tree Swallow
Bank Swallow
Common Loon
Northern Rough-winged
Swallow
Canada Goose
Wood Duck
American Black Duck
Mallard Duck
American Widgeon
Ring-necked Duck
Evening Grosbeak
Northern Cardinal
Wild Turkey
Woodcock
Common Merganser
Hooded Merganser
Cedar Waxwing
Warbling Vireo
Swamp Sparrow
Wood Peewee

White Throated Sparrow
Song Sparrow
House Finch
Gold Finch
Rock Dove
Chimney Swift
Kingbird
Catbird
Turkey Vulture
Mourning Dove
Sharp Shinned Hawk
Red Tailed Hawk
Kestrel
Blue Jay
Titmouse
Red Breasted Nuthatch
White Breasted Nuthatch
Hairy Woodpecker
Downy Woodpecker
Junco
Starling
Pine Siskin
Brown Creeper
Grackle
Purple Finch
Fox Sparrow
Cow Bird
Rusty Blackbird
Wood Thrush
Chipping Sparrow
Indigo Bunting
Ovenbird
Towhee
Eastern Phoebe
Oriole
Mockingbird
Barn Swallow
Red-winged Blackbird
Eastern Bluebird
Indigo Bunting
Pileated Woodpecker
Nighthawk
Black-capped Chickadee
Northern Flicker
Barred Owl
Red poll
Scarlet Tanager
Whip-poor-will
Eastern Kingbird
Broad Winged Hawk
Cliff Swallow
Double Crested
Cormorant
Spotted Sandpiper
Lesser Yellowlegs
Various Warblers
Northern Pintail
Snow Goose
Green Winged Teal
Virginia Rail
Bufflehead
Common Goldeneye

Reptiles. A number of reptiles commonly found in the rivers corridor were identified by the Contoocook and North Branch Rivers Local Advisory Committee River - Corridor Management Plan.

Black Snake
Dekay's Snake
Ribbon Snake
Painted Turtle
Snapping Turtle
Milk Snake
Redbelly Snake
Common Water Snake
Spotted Turtle
Eastern Ringneck Snake
Eastern Hognose Snake
Musk Turtle
Wood Turtle

Amphibians. Several species of amphibians can be found in the river corridor areas.

Two Line Salamander
Dusky Salamander
Bull Frog
Leopard Frog
American Toad
Wood Frog
Spring Peepers
Red Spotted Salamander
Mud Puppy
Green Frog
Pickerel Frog
Fowler's Toad
Spotted Salamander

Threatened or Endangered Species

The Contoocook River corridor provides habitat for a number of threatened or endangered bird, mammal, fish, reptile, and plant species.

Table IV-11. Threatened and Endangered Vertebrates in the Contoocook River corridor.

Species	Scientific Name	Status
Pine Martin	Martes americana	Threatened
Canada Lynx	Lynx canadensis	Endangered
Small-footed bat	Myotis leibii	Endangered
Common Loon	Gavia immer	Threatened
Common Nighthawk	Chordeiles minor	Threatened
Purple Martin	Progne subis	Threatened
Osprey	Pandion haliaetus	Threatened
Northern Harrier	Circus cyaneus	Threatened
Cooper's Hawk	Accipiter cooperii	Threatened
Pied-billed Grebe	Podilymbus podiceps	Endangered
Bald Eagle	Haliaeetus leucocephalus	Endangered
Peregrine Falcon	Falco peregrinus	Endangered
Sedge Wren	Cistothorus platensis	Endangered
Loggerhead Shrike	Lanius ludovicianus	Endangered
Henslow's Sparrow	Ammodramus henslowii	Endangered
Sunapee Trout	Salvelinus agassizi	Endangered
Shortnose Sturgeon	Acipenser brevirostrum	Endangered
Timber Rattlesnake	Crotalus horridus	Endangered

Table IV-12. Threatened or Endangered Plant Species in the Contoocook River Corridor.

Species	Scientific Name	Status
Wild Lupine	Lupinus perennis	Threatened
Andrew's Gentian	Gentiana andrewsii	Threatened
Three-seeded Mercury	Acalypha rhomboidea	Threatened
Fringed Gentian	Gentianopsis crinita	Threatened
Ginseng	Panax trifolius	Threatened
Rue Anenome	Anemonella thalictroides	Threatened
Barren Strawberry	Waldsteinia fragarioides	Threatened
Farwell's Milfoil	Myriophyllum farwellii	Threatened
Common Mare's Tail	Hippuris vulgaris	Threatened
Green-adder's Mouth	Malaxis unifolia	Endangered
Sweet Coltsfoot	Petasites palmatus	Endangered
Hoary Mt. Mint	Pycnanthemum incanum	Endangered
Arethusa	Arethusa bulbosa	Endangered

Agriculture-Livestock

The second largest Certified Organic Farm in New Hampshire, Rosaly's Garden, is located in Peterborough. With 16 acres under cultivation, the farm grows a wide array of vegetables, herbs, flowers and fruit. There is a farmstand on the farm and where 90% of the produce is sold with the rest sold to local restaurants, stores, several culinary schools, and the McDowell Artist's Colony.

According to the New Hampshire State and County Data-2002 Census of Agriculture (Vol. 1, Geographic Area Series, Part 21), Hillsborough County in which Peterborough is located has a significant number of livestock animals in the county inventory. According to the 2002 agricultural census, there were 2,325 cattle and calves; 3,774 goats; and 461 bison present in the county.

Boston University Medical Center
Boston, Massachusetts
Latitude: 42°20'06"N
Longitude: 71°04'21"W

Boston University Medical Center Key Location Map

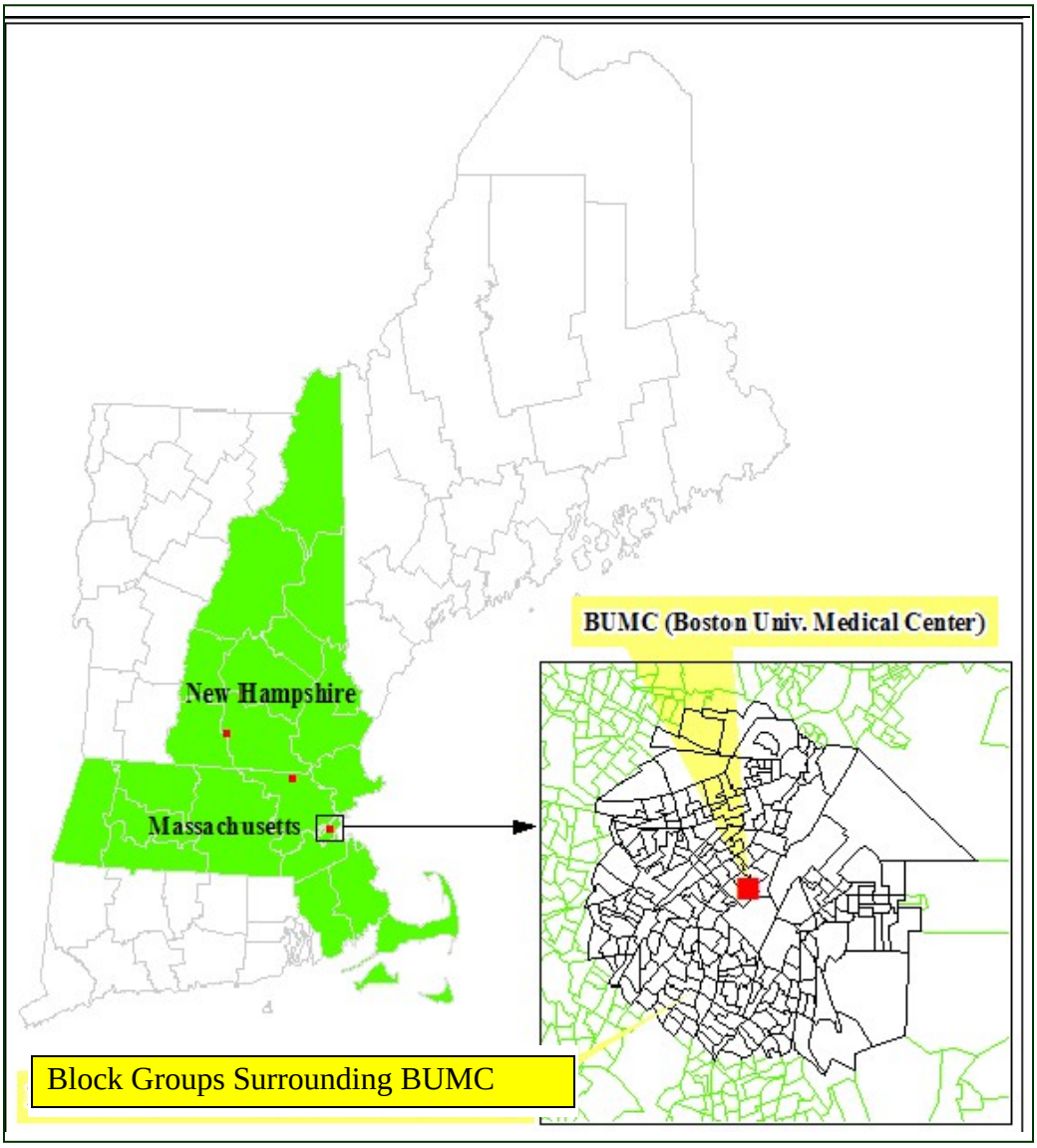

Figure IV-82. Boston University Medical Center Key Location Map.

Location and Site Description

The proposed Boston University Medical Center project site is located in the southeast portion of the South End in the City of Boston within Suffolk County. The South End is a densely developed residential area bordered by institutional and industrial areas south of Harrison Avenue. Beginning in the 1900s, the South End began to attract a number of the city's churches, hospitals and other institutions, including Boston City Hospital (now Boston University Medical Center).

Commercial activity in the South End is concentrated along Columbus Avenue, Tremont Street and Washington Street, and includes many fine restaurants while the medical and research uses are concentrated along Albany Street and Harrison Avenue. The institutional/industrial uses located south of Harrison Avenue include the Boston University Medical Center (BUMC), the BioSquare Research Park, the Boston Flower Exchange facility on Albany Street and the Suffolk County House of Correction. The 28,160 residents of the South End are highly diverse in terms of race, ethnicity and household income. The area has a significantly higher than average male population, an above average median income, a lower than average unemployment rate, and an above average poverty rate compared to the rest of the City of Boston.

The Greater Boston Region, which includes all of Suffolk County, as well as a large share of Middlesex and Norfolk Counties, and portions of Plymouth and Essex Counties, is widely recognized as one of the world's most innovative economic areas. Home to some of the finest institutions of higher education, the region has generated a tremendous concentration of science- and technology-related research and development (University of Massachusetts, 2004). There are 22 hospitals and 35 colleges and universities within Boston's city limits (BRA, 2002). According to the University of Massachusetts' Massachusetts Benchmarks project, these intellectual resources, combined with the region's rich heritage and extensive cultural offerings, make Greater Boston the center of much of Massachusetts' economic activity (University of Massachusetts, 2004).

The region is home to half the state's workforce and jobs. According to the Bureau of Economic Analysis, the personal income generated by the residents of Suffolk, Norfolk, and Middlesex Counties accounts for more than 50% of the state total. The knowledge-intensive export clusters that drive the state's larger economy, knowledge creation, information technology, financial services, and health care are concentrated in Greater Boston (University of Massachusetts, 2004).

The proposed Boston-NBL facility site is located in the BioSquare Research Park. The facility's location in the BioSquare Research Park, which is adjacent to the Boston University Medical Center (BUMC) campus and within the Greater Boston academic hub, would allow for dynamic collaborations among investigators at multiple research entities such as the Boston University School of Medicine, Harvard Medical School, Massachusetts Institute of Technology, Massachusetts General Hospital, Brigham and Women's Hospital, University of Massachusetts Medical Center, the Massachusetts

Biological Laboratories, Tufts University, New England Medical Center, Brandeis University and others. See Figure IV-83.

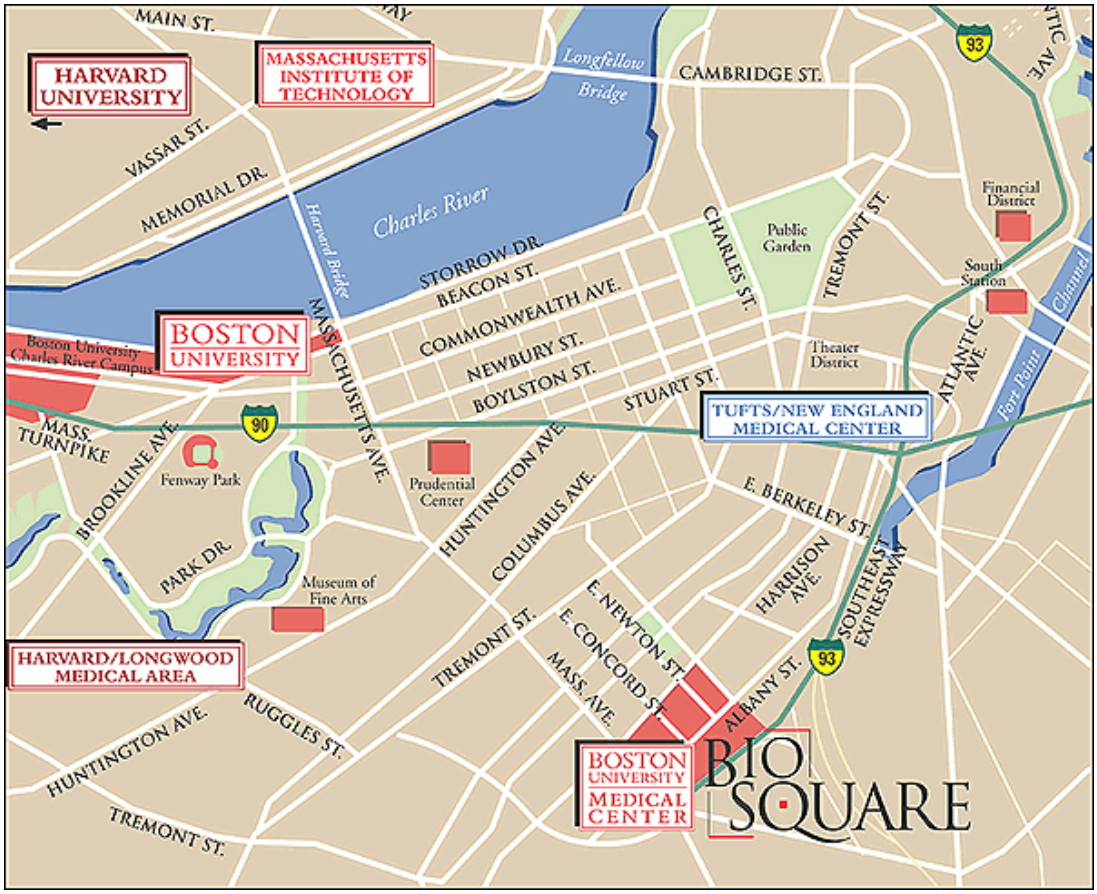

Figure IV-83. Boston University Medical Center at the BioSquare Research Park is in the proximity of multiple medical research institutions.

Visual Quality

The Project site is located in the South End of Boston across Albany Street from and south of BUMC, and west of Interstate I-93 and north of the Massachusetts Avenue Connector. The parcel is bordered on the west by the BioSquare Phase I site and on the east by the Boston Flower Exchange and Frontage Road.

The South End is a stable yet diverse neighborhood in the City of Boston, which has experienced economic growth in the past two decades. The area consists of a variety of land uses including residential neighborhoods, institutional uses such as the BUMC, and commercial and industrial uses. The immediate Project area is comprised of commercial, industrial, transportation and industrial uses (See Following Land Use Map). Current South End development projects comprise a variety of land uses (See Table IV-13).

The visual quality of the area is framed by the existing 150-foot high BioSquare Research Park buildings, the BUMC Power Plant, the 11-story Suffolk County House of Correction, Interstate I-93 and a variety of large institutional buildings north of Albany Street in the BUMC campus. A section of the adjacent neighborhood, along East Brookline Street, is composed of two and three story brick townhouses.

Figure IV-84. Boston University Medical Center is located on Albany Street in the South End of Boston.

Figure IV-85. View of Albany Street looking toward BioSquare Research Park.

Figure IV-86. Boston University Medical Center.

Figure IV-87. Boston Flower Exchange – adjacent to the NEIDL Site on Albany Street.

Table IV-13. Development Projects in South End/BayVillage.

Project	Status	Type	Address	Bldg Size
285 Columbus Ave	Board Approved	Retail Residential Ownership	285 Columbus Ave	92,600 sqft
301 Columbus Avenue	Under Construction	Residential Ownership	301-319 Columbus Ave	102,160 sqft
601 Albany Street	Board Approved	Retail Residential Ownership	601-605 Albany Street	48,602 sqft
731 Harrison Avenue	Construction Complete	Retail Residential Rental Ownership Cultural	731 Harrison Ave.	86,270 sqft
Albany Street Residences	Board Approved	Retail Residential Ownership	525-527 Albany Street	98,682 sqft
Alexandra Hotel Rehab	Board Approved	Retail Residential Rental	1759-1769 Washington Street	38,007 sqft
BioSquare I - NPC - Master Plan Amendment	Board Approved		600 Albany Street	680,000 sqft
BioSquare I - Parcel D - Dev. Plan	Under Construction	Research Institutional	600 Albany Street	160,000 sqft
BioSquare II - PDA with NBL	Under Construction	Retail Institutional Medical Clinical Medical Research Other Research	705-710 Albany Street	428,700 sqft
BUMC - Moakley Cancer Care Center	Under Construction	Medical Clinical	8 00 Harrison Avenue	105,000 sqft
Columbus Center	Board Approved	Hotel Retail Residential Ownership	101 Clarendon Street and 100 Berkley Street	1,302,000 sqft
D-4 Police Station	Under Construction	Residential Ownership	7 Warren Avenue	38,860 sqft

Source: Boston Redevelopment Authority
http://www.cityofboston.gov/bra/DevelopmentProjects/devprojects.asp?action=ViewHood&HoodID=18

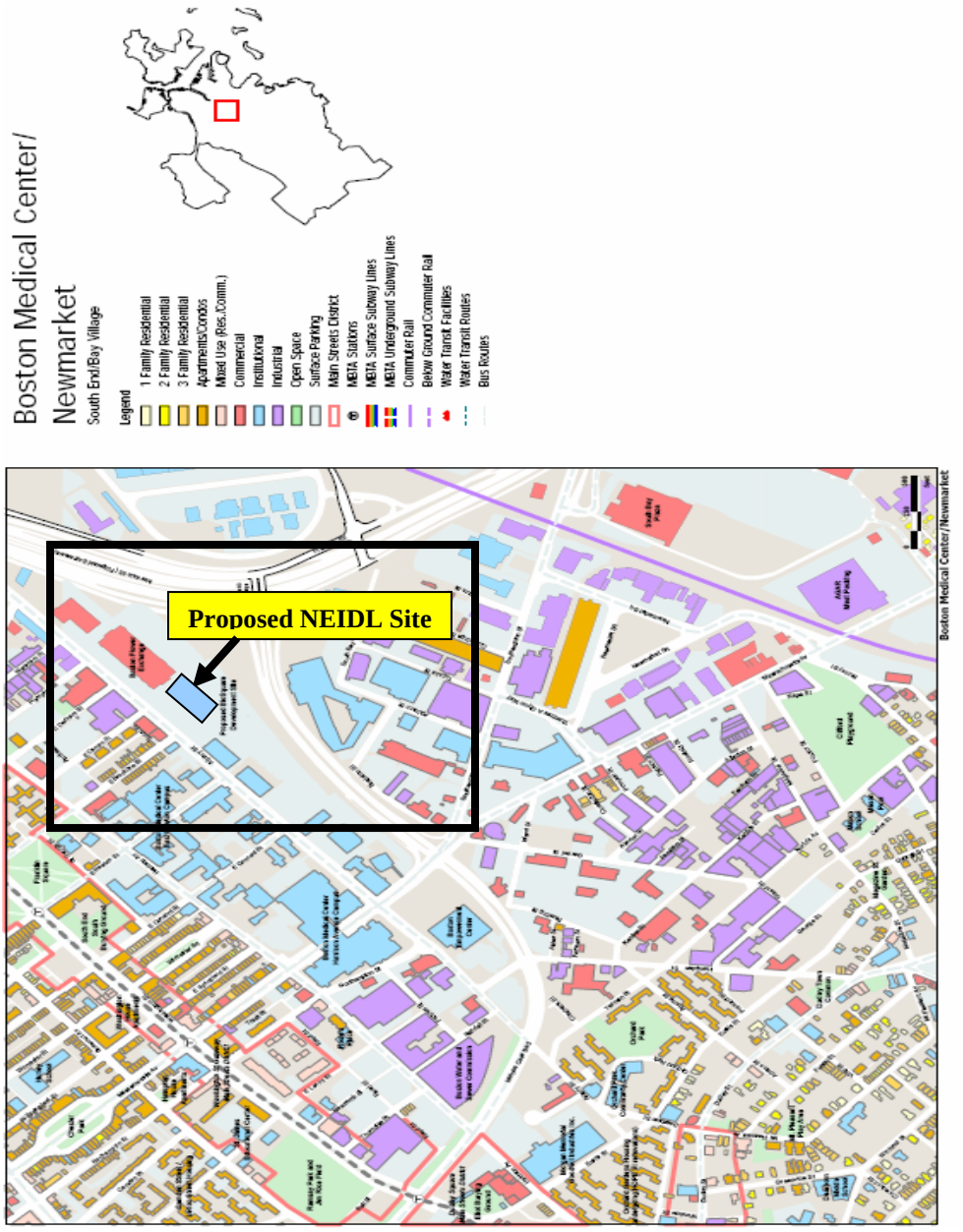

Figure IV-88. Land Use Map - Boston Medical Center and Surrounding Area.

Historic Resources

The Boston Landmarks Commission established standards and criteria for the South End Harrison/Albany Protection Area "to protect views of the adjacent Landmark District, to ensure that new development of major alteration adjacent to the District is architecturally compatible in massing, setback, and height, and to protect light and air circulation within the District."

Portions of the South End are included in the South End National Register District, which contains the largest intact Victorian row house district in the country. The district was listed in the National Register of Historic Places in May 1973 and is included in the State Register of Historic Places. A slightly expanded area of the South End was designated as a Boston Landmark District by the City of Boston in November. In the same year, the City of Boston also created the South End Harrison/Albany Protection Area "so as to maintain a transitional area adjacent to the Landmark District".

The proposed NEIDL site is not located within the South End National Register District or within the South End Landmark District . The site is located within the South End Harrison/Albany Protection within the commercial, industrial and institutional area near the South End National Register District. The NEIDL would be visible from within the District, but would be consistent with the architecture of surrounding commercial and institutional buildings and would have no direct effect on the District. See Figure IV-89 for placement of the NEIDL in relation to the surrounding historic districts.

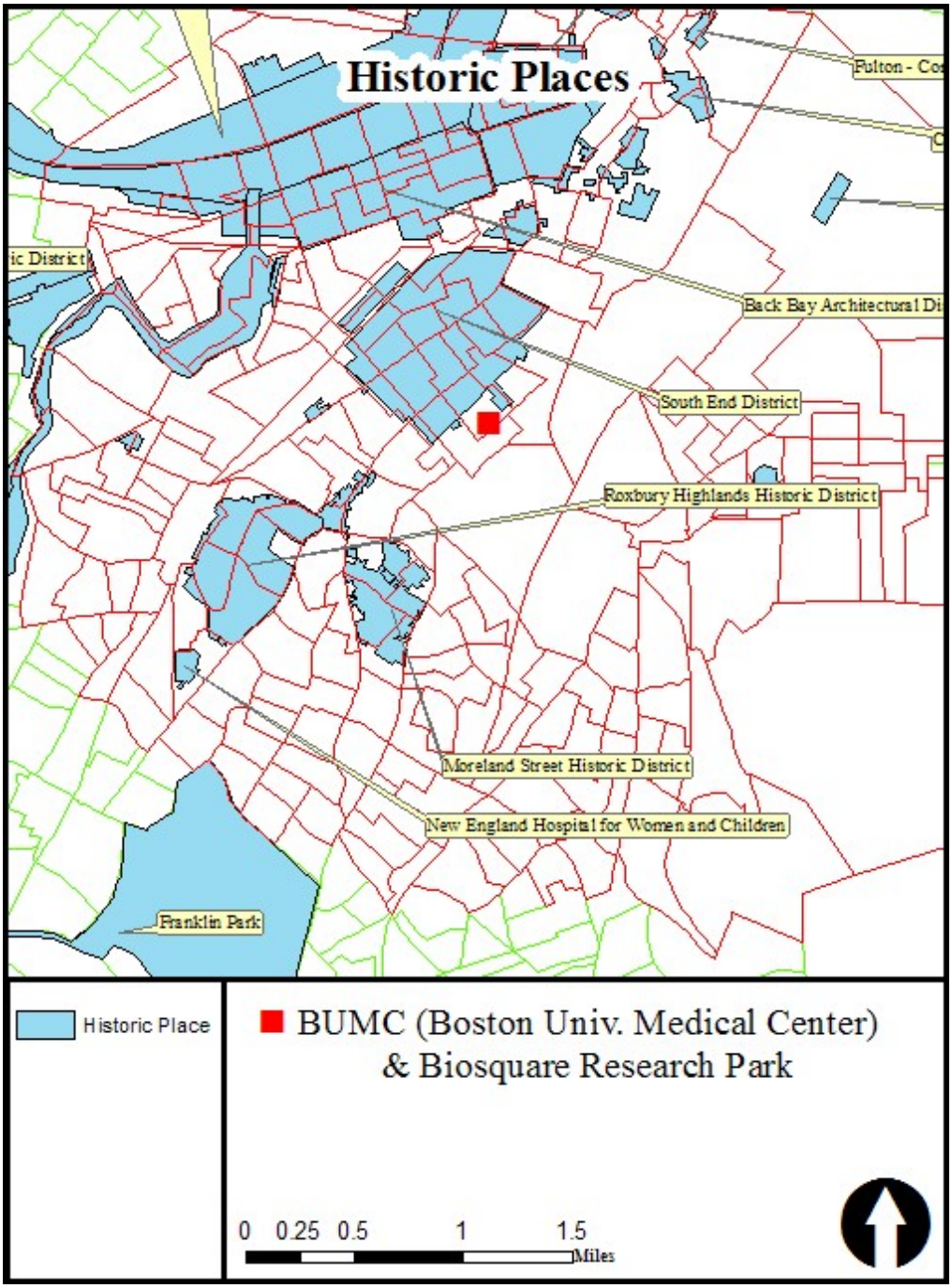

Figure IV-90. Location of historic places surrounding BUMC and BioSquare Research Park.

Noise

The City of Boston and the state Department of Environmental Protection (DEP) have different noise impact criteria. The City's ordinance establishes maximum daytime and nighttime sound levels for different land uses that should not be exceeded. The State requires that the proposed project not increase sound levels by more than 10 dBA above existing levels. The Boston Air Pollution Control Commission regulates noise in the City of Boston based on land use classification. The regulations establish a maximum sound level for residential areas, of 60 decibels (dBA) during the daytime (7:00 am to 7:00 pm) and 50 dBA at nighttime (7:00 pm to 7:00 am). The City of Boston has also established noise limits that apply to nine octave band center frequencies. The state Department of Environmental Protection (DEP) regulates noise from industrial facilities as an "air contaminant". The regulations prohibit activities that increase the broadband sound pressure level more than 10 dBA above the ambient (background) level, or which results in a pure tone condition. The ambient (background) sound pressure level is defined as the background L90 level measured when the facility is not operating, but during a time period when it would normally operate. The L90 is the measured sound level that is exceeded 90 percent of the time. That is, 10 percent of the time the sound level would be less than this amount and 90% of the time the sound level would be higher than this amount. The L90 provides a good representation of the general background sound level since it excludes the impacts from brief spikes in the noise level. A pure tone condition occurs when any octave band sound pressure level exceeds the average of the two adjacent octave band sound pressure levels by 3 dBA or more. The DEP noise regulations are applied at the nearest property line and the nearest residence and they do not regulate noise from moving motor vehicles.
A noise level study was undertaken as part of the 2003 Draft Project Impact Report/Environmental Impact Report for the BioSquare Phase II development project (Fort Point Associates, Inc., 2003), which included the Boston-NBL site. Noise monitoring was performed at the Project site to evaluate the existing ambient sound level (L90) during the quietest time of the day (nighttime). The study results indicated that the main sources of noise during the nighttime sound level measurements are motor vehicle traffic on the Southeast Expressway, traffic on the Massachusetts Avenue Connector, other local roadway traffic, and mechanical equipment (primarily air conditioners). Existing nighttime sound levels in most locations already exceed the City of Boston criteria of 50 dBA.

Table IV-14. Summary of predicted noise impacts compared to the city of Boston noise limits.

Receptor	Maximum Predicted Sound Level Impacts from the Proposed Project (dBA)	City of Boston Residential Noise Limits [daytime/nighttime] (dBA)
Worst-Case Property Line – Northwest Side of the Project, at Ground Level, on Albany Street Sidewalk	33	60/50
Worst-Case Residence – Top Floor of 109 E. Canton Street	33	60/50
Worst-Case Hospital – Top Floor of the Newton Pavilion Building, at the Boston Medical Center	30	60/50

TableIV-15. Massachusetts Department of Environmental Protection Criteria for the period with minimum background noise.

Receptor	Measured Background Sound Level (L90) (dBA)	Maximum Predicted Sound Level Impact from Project (dBA)	Total Predicted Sound Level (dBA)	Predicted Sound Level Increase (dBA)
Worst-Case Property Line – Northwest Side of the Project, at Ground Level, on Albany Street Sidewalk	54	33	54	No Change
Worst-Case Residence – Top Floor of 109 E. Canton Street	54	33	54	No Change
Worst-Case Hospital – Top Floor of the Newton Pavilion Building, at the Boston Medical Center	54	30	54	No Change

The noise analysis demonstrates that the existing sound levels currently exceed the City's noise criteria. The proposed NEIDL project will generate building sound levels that are below the existing sound levels. It is important to note that even with the best mitigation techniques to reduce sound levels, the future sound levels at the study area receptor locations will continue to exceed the City's noise criteria with the proposed project.

Utilities

Natural Gas. The Project would purchase natural gas from KeySpan Energy. The facility is designed to use either district steam or natural gas as the primary heating medium. There is currently a 30" intermediate pressure main which runs the full length of the site in Albany Street. The anticipated gas requirement for the Boston-NBL is

approximately 1,650 cubic feet per hour (cfh) when self-generating steam. Gas service would be provided by a natural gas service connection from Albany Street.

Steam. The Project is capable of utilizing district steam as its heating medium. There is currently an existing 12" steam line located beneath Albany Street south of East Newton Street. This service line was extended into the BioSquare Research Park development. The existing service would be extended to the Project site. Anticipated steam demand from the Project is approximately 19,300 pounds per hour.

Electrical. NStar Electric would provide electric service for the Project. An existing 13.8 kilovolt (KV) distribution system in Albany Street would be extended into the Project site. The building would be provided with secondary service at 480/277 volts from a secondary spot network located within the building. Each spot network would include multiple transformers, each fed from a different 13.8 KV circuit to provide redundancy in the event of a primary feeder or transformer failure. Anticipated electric demand from the Project is approximately 8,900 Kva.

Water System. An existing Boston Water and Sewer Commission (BWSC) water main located in Albany Street would provide water service to the Boston-NBL facility. The Project would require extending the looped water services through the site and creating new connections to the service water mains in Albany Street. The building water services would incorporate reduced pressure assembly backflow preventers on the connections to the municipal water supply as required by the Massachusetts State Plumbing Code and NIH Design Policy and Guidelines (U.S. DHHS 2003b). The backflow preventers would be inspected annually to ensure proper operation. In addition to these devices, the facility would incorporate several further levels of protection by segregating all non-potable systems connections including HVAC make up water and laboratory water services. An added layer of protection would be incorporated as water services enter the BSL-4 envelope.

Sanitary Sewer. An existing BWSC sanitary sewer line in Albany Street would provide sanitary sewer service to the Boston-NBL facility. All liquid waste from all laboratories would be monitored and receive additional treatment prior to discharge to the sanitary system (see Waste Decontamination below).

Stormwater. Stormwater runoff from the site would discharge into the existing BWSC system entering the Roxbury Canal Conduit, which runs through the site and flows easterly toward an outfall in the Fort Point Channel, a coastal water body located approximately 0.9 miles from the Project site.

Transportation and Access

Boston is New England's leading port; a regional rail, bus, and truck terminal center; and an important air transport center. Boston is a hub from which many highways extend to serve the city to the north, west and south. See Figures IV-91 and 92.

Major Highways. Route 128 forms a circumferential highway around Boston. The Central Artery gives access to the downtown area, and the Southeast Expressway extends to the South Shore area. The Massachusetts Turnpike (I-90) crosses Route 128 in Weston and terminates in West Stockbridge, with an extension to the New York Thruway.

Rail. Amtrak provides passenger service to New York City and Washington, D.C. MBTA subway service is available on the Red, Orange, Green and Blue lines. Commuter rail service is available to both North and South Stations. Conrail and the Springfield Terminal Railway (STRR) offer freight service to Boston. Conrail has an intermodal facility in Allston and a Flexi-Flo terminal in Boston.

Bus. Boston is a member of the MBTA (Massachusetts Bay Transportation Authority), which provides fixed route service within the city and to surrounding towns. The MBTA also provides THE RIDE, a paratransit service for the elderly and disabled.

Other. Logan International Airport, easily accessible from downtown Boston, is the busiest Primary Commercial Service (PR) facility in New England. Also, Hanscom Field in Bedford and Norwood Memorial Airport provide commercial service. The Nashua Street Heliport is located near North Station. MBTA commuter boat service is available to Charlestown and to Hingham.

Figure IV-91. Road System Surrounding BU Medical Center.

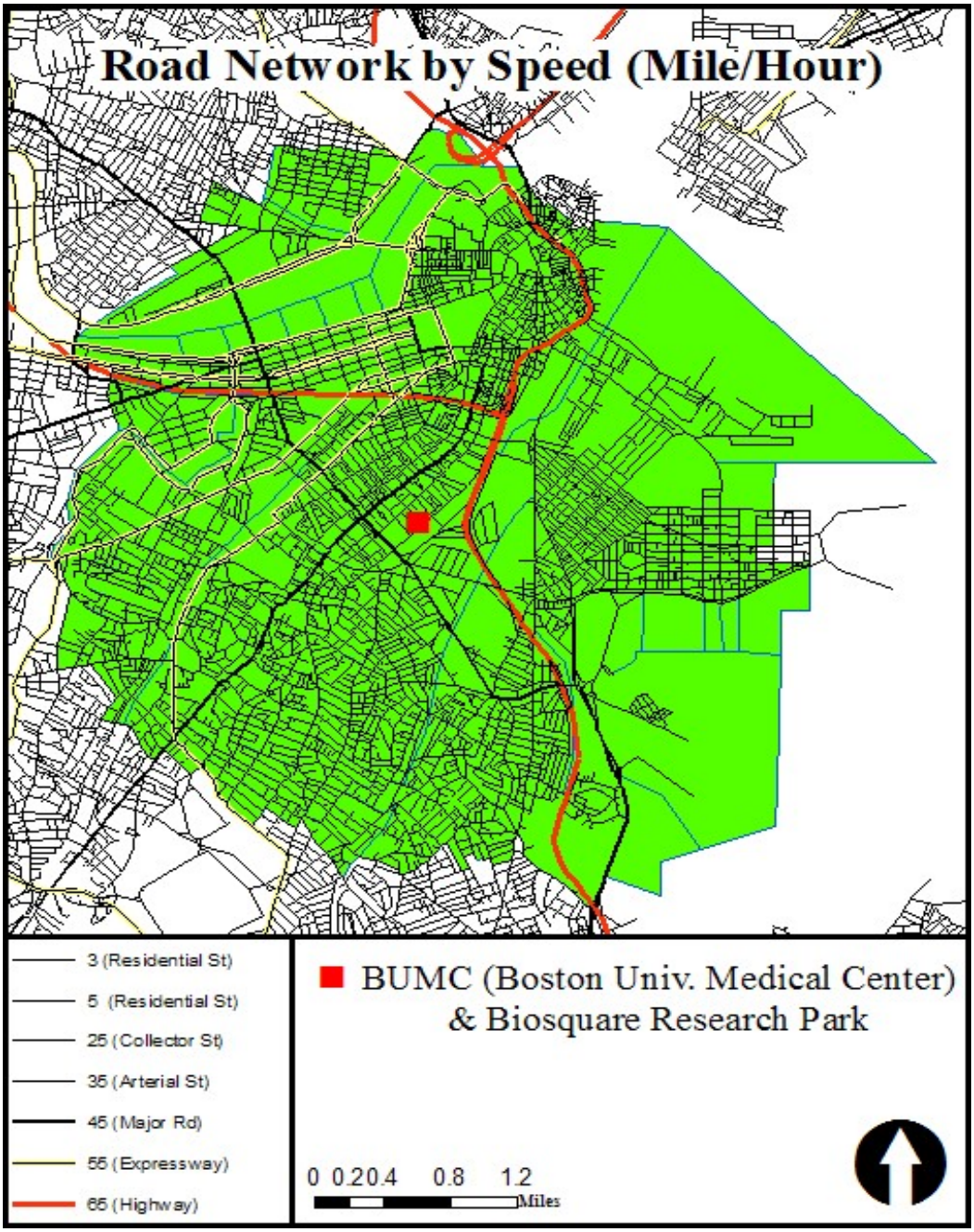

Figure IV-92. Representation of the road network surrounding BUMC.

Air Quality

The U.S. EPA uses seven "criteria pollutants" as indicators of air quality, and has established for each of them a maximum concentration above which adverse effects on human health may occur. These threshold concentrations are called National Ambient Air Quality Standards (NAAQS). Massachusetts has established the same air quality standards. The City of Boston is currently classified as being in attainment (i.e. compliance) with the NAAQS for all criteria air pollutants (except ozone).
In 2004, the U.S. EPA designated Eastern Massachusetts as moderate nonattainment for 8-hour ozone NAAQS. However, data from the ozone air monitor closest to the project site at Harrison Avenue shows that 8-hour ozone levels in the project area for the past three years have been in compliance with the NAAQS for ozone. Additionally, information from air monitoring data for 2004, recently made available, also show compliance with the 8-hour ozone standard at the Harrison Avenue monitor. Major sources of these ozone precursor air pollutants in urban areas include power plants and motor vehicles. Ozone concentrations in the project area are made up of natural ozone; locally generated ozone; and ozone transported from upwind urban areas. Emissions of VOC and NOx in the study areas have almost no effect on local ozone levels due to their relatively small size and are insignificant when compared to emissions from the entire region and urban areas upwind (such as Providence, RI; Hartford, CT; and New York City), and do not have a significant impact on ozone levels in the project area.
On January 5th, 2005 the EPA published a final rule that designated that the entire Commonwealth of Massachusetts is classified as being in attainment of the fine particulate matter (PM 2.5) air quality standards (Federal Register, 2005). These air quality standards, have been established to protect the public health and welfare in ambient air, with a margin for safety.

Economics, Income and Demographics

The economic boom of the 1990s benefited the Greater Boston region unevenly, as some residents actually saw a decline in their financial well-being. The economy currently faces the growing challenge of housing affordability. There is an insufficient stock of affordable housing and a growing "affordability gap", the difference between families' median income and the income required to buy a median-price home (University of Massachusetts, 2004).
In 2000, educational, health and social services made up the greater Boston region's largest industry sector in terms of employment. This was followed by retail trade; manufacturing; and finance, insurance, and real estate (FIRE). The industry mix changed during the economic expansion between 1993 and 2000. Notable changes were the increases in services and FIRE, at the expense of manufacturing and some government employment. Overall, regional employment grew 20.7% during this period, with services growing 30.7%, retail trade 15.4%, and construction 67.5% (University of Massachusetts, 2004). Much of the region's economic growth during the 1990s benefited high-wage, educated workers and was concentrated in its outer ring. Over the 1990-2001 period, the Greater Boston Region's workforce increased by 3.6%, the same as the state's overall

rate. Almost all of this growth came in 2001, after a decade of recovering losses incurred in the early-1990s recession. During the decade between 1990 and 2000, the Greater Boston unemployment rate was below that of the state, reaching a low of 2.2% in 2000 (University of Massachusetts, 2004).
The unemployment rate in Greater Boston increased from 2.2% in 2000 to 2.8% in 2001, and then to 4.3% in 2002. The increase has been accompanied by the loss of thousands of jobs, especially in the high-tech sector. While household-based data shows a decline of approximately 23,000 jobs in 2002, the number of "establishment" jobs lost is larger. "Establishment" employment data accounts for commuters into the Boston area, while household data does not (University of Massachusetts, 2004).
Details the Year 2000 employment characteristics as defined by the 2000 Census for the Commonwealth of Massachusetts, the City of Boston and the South End are provided in Table IV-16, below. Management, professional and related occupations comprise the majority of jobs within the State, City and within the South End neighborhood, with sales and office occupations following behind in all three areas.

Table IV-16. Employment Characteristics of Boston and the South End, 2000

Industry	Massachusetts	Boston	South End
Employed civilian populations (16 yrs or older)	3,161,087	285,859	15,483
Management, professional and related occupations	1,298,704	123,850	8,604
Service occupations	444,298	50,839	2,237
Sales and office occupations	818,844	73,199	3,557
Farming, fishing and forestry occupations	6,642	223	0
Construction, extraction and maintenance occupations	235,876	14,118	357
Production, transportation and material moving occupations	356,723	23,630	728

Source: Census Bureau, 2000, Table P50, Sex by Population for the Employed Civilian Population 16+ Years. BRA, 2003, p. 11, Table 36, Occupation. Additional data for the Massachusetts and the City of Boston was taken from U.S. Census data.

According to the Boston Redevelopment Authority's South End 2000 Census of Population and Housing Report #576, there are a total of 14,300 individual households in the South End with a median household income of $41,590. These households are further broken down by family and non-family designations. The 2000 U.S. Census defines a household to include all the persons who occupy a housing unit, regardless of their relationship. A housing unit is a house, an apartment, a mobile home, a group of rooms, or a single room that is occupied (or if vacant, is intended for occupancy) as separate living quarters. A family household has at least two members related by birth, marriage, or adoption, one of whom is the householder. Non-family households are those people who are living alone or are householders who share living space with non-relatives only, such as a boarder or roommate. These categories are the typical income brackets for Census data. The number of family households in the South End is 4,723 with a median income of $35,416. The number of non-family households in the South End is 9,577 with a median income of $42,842.

The per capita personal income, which is calculated by dividing all personal income, received by all permanent residents by the total population, in the nation, state of Massachusetts, City of Boston, and South End neighborhood for 1990 and 2000 is provided in Table IV-17. The Massachusetts state per capita personal income in 2000 was $37,756. In 2000, the per capita personal income for the South End was $36,083 which is similar to the per capita income for the state which is ranked 7th in the nation for per capita personal income by state. The South End per capita income level for the year 2000 is $36,038 or 1.2% above the national level. This is a significant change compared to the South End's 1990 per capita income level of $17,824.

Poverty levels indicate the percentage of the population with incomes below that necessary for basic necessities including adequate housing, food, transportation, energy and health care. According to the 1999 U.S. Census data 573,421 people or 9.3% of the state's population were living below the poverty level. This is less than the poverty statistics for the nation as a whole, which in 1999 listed 33,899,812 people (or 12.4%) living below the poverty threshold. In the City of Boston, the 2000 poverty levels were 19.5%, while in the South End the levels were higher at 23.9%. The South End poverty level and above average median income level provide an indication of the area's economic diversity.

Table IV-17. Comparison of per capita personal income in Massachusetts , Suffolk County, Boston and the South End.

Year	U.S.	Massachusetts	Massachusetts % of the U.S.	Suffolk County	Boston	South End
2000	$29,847	$37,756	126%	$22,766	$23,353	$36,083
1990	$19,477	$23,043	118%	$15,414	$15,581	$17,824

Source: Information for U.S. and Massachusetts taken from U.S. Department of Commerce Bureau of Economic Analysis, 2000, SA1-3, Personal Per Capita Income. Information for Suffolk County and Boston taken from U.S. Census Bureau, 2000, Table P8, Sex by Age and Table P158, Aggregate Income in 1999 (Dollars) for the Population 15+ Years; and from BRA, 1992, p. 16. South End information taken from BRA, 2003, p. 14, Table 44, Per Capita Income; and from the BRA, 1993, p.16.

Greater Boston is the most populous of the state's regions with its 3,015,981 residents, accounting for nearly half of the Commonwealth's population. Between 1990 and 2000, the region lagged behind the state in population growth rising 4.9% versus 5.5% (University of Massachusetts, 2004). In the City of Boston, population actually grew between 1990 and 2000, from 574,283 to 589,141, an increase of 3%. A comparison of population and demographic trends of Boston and the South End is provided in Table IV-18.

Table IV-18. A Comparative Overview of Boston and the South End.

Attribute	Boston	South End
Population	589,141	28,160
Foreign Born Population	25.8%	20.6%
White alone	320,699	14,048
Black or African American alone	146,958	7,053
American Indian and Alaska Native alone	2,581	199
Asian, Pacific Islander alone	44,563	3,236
Other race alone	46,709	2,504
Two or more races	27,631	1,120
Non-Hispanic, White Population	290,972	12,751
Hispanic Population	85,199	4,578
Poverty Rate	19.5%	23.9%
Unemployment Rate	7.2%	6.9%
Median Household Income	$39,629	$41,590
Housing Units	251,935	15,261
Occupied Housing Units	95.1%	93.6%
Median Gross Rent	$802	$707
Spoken Language at Home - English Only	66.6%	67.8%
Occupation - Service Industry	17.8%	14.4%
Occupation - Management, Profess. Etc.	43.3%	55.6%

Source: BRA, 2003, from Comparative Overview Table and p. 1, Table 2, Racial Composition. Additional data about race in the City of Boston was taken from U.S. Census Bureau, 2000, Table P6, Race.

In the 1990s, the median age in Greater Boston rose from 34.0 to 36.3, slightly below the statewide median of 36.6 years. This small increase masks a significant shift in the region's age profile. The population of those ages 45 to 64 increased almost 22% to 666,805, while the 19- to 24-year-old group fell by almost 19%, to 291,454 (University of Massachusetts, 2004). In the South End, the median age is 34.1, which is slightly younger than the median age in the City of Boston. While both the state and region experienced a mini "baby boom," this has not been enough to counter the aging of the population, which is likely to have a significant effect on the economy. Employers will find that the aging workforce will require them to adjust their hiring practices to accommodate older, more experienced workers for entry-level positions (University of Massachusetts, 2004). According to the 2000 U.S. Census, 28,160 people reside in the South End, comprising 5% of the population of Boston. Of that population, 50% are minority. Details describing the demographic characteristics for the Commonwealth of Massachusetts, Suffolk County, the City of Boston and the South End for Year 2000 are provided in Table IV-20.

Table IV-20. Comparison of Demographic Characteristics of Massachusetts, Suffollk County, Boston and the South End, 2000.

Demographic Characteristics	Massachusetts	Suffolk County	Boston	South End
Total Population	6,349,097	689,807	589,141	28,160
Gender				
Male	3,058,375	332,918	283,548	15,262
Female	3,290,722	356,889	305,593	12,898
Age Group				
0-4	394,848	38,099	31,765	1,067
5-9	431,318	40,426	34,045	1,219
10-14	431,562	39,218	32,582	1,171
15-19	411,955	47,980	42,283	1,200
***20-24**	406,139	77,580	70,892	2,641
25-34	920,320	140,406	123,522	7,295
35-44	1,075,986	104,807	88,041	5,241
45-54	873,074	75,672	63,691	3,533
55-59	307,886	27,262	22,511	1,288
60-64	236,408	21,855	18,208	1,129
65-74	430,427	38,743	31,357	1,375
75-84	315,532	27,523	22,139	741
85 and over	113,642	10,236	8,105	260

Source: BRA, 2003, p. 2, Table 7, Age, Race and Sex. Additional data for the Massachusetts, Suffolk County and the City of Boston was taken from U.S. Census Bureau, 2000, Table P8, Sex by Age.

The following maps (Figures IV-93 through 106) show the distribution of various demographic statistics across the Block Groups in the area of interest.

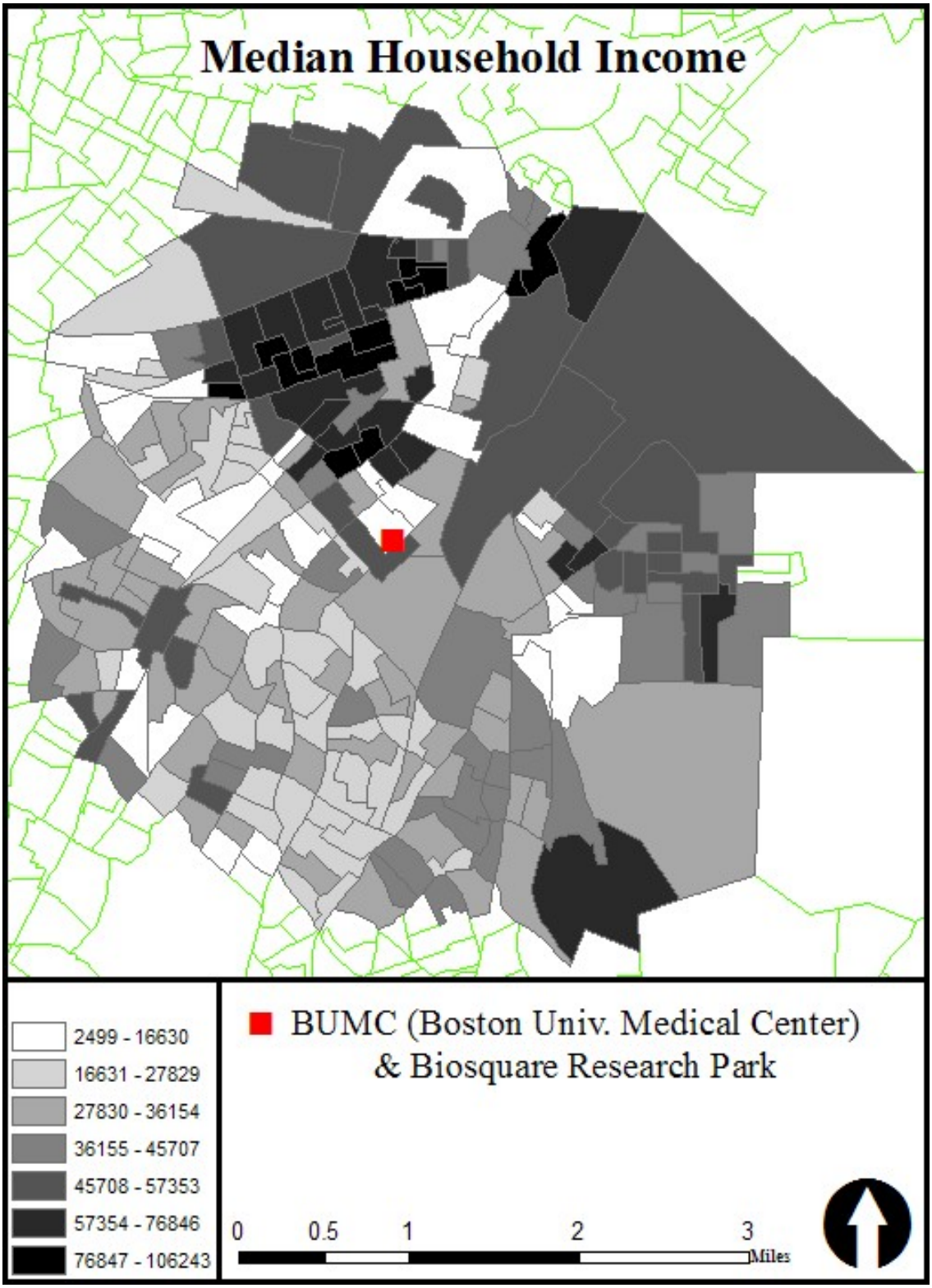

Figure IV-93. Distribution of Median Household Income across the Block Groups surrounding BUMC.

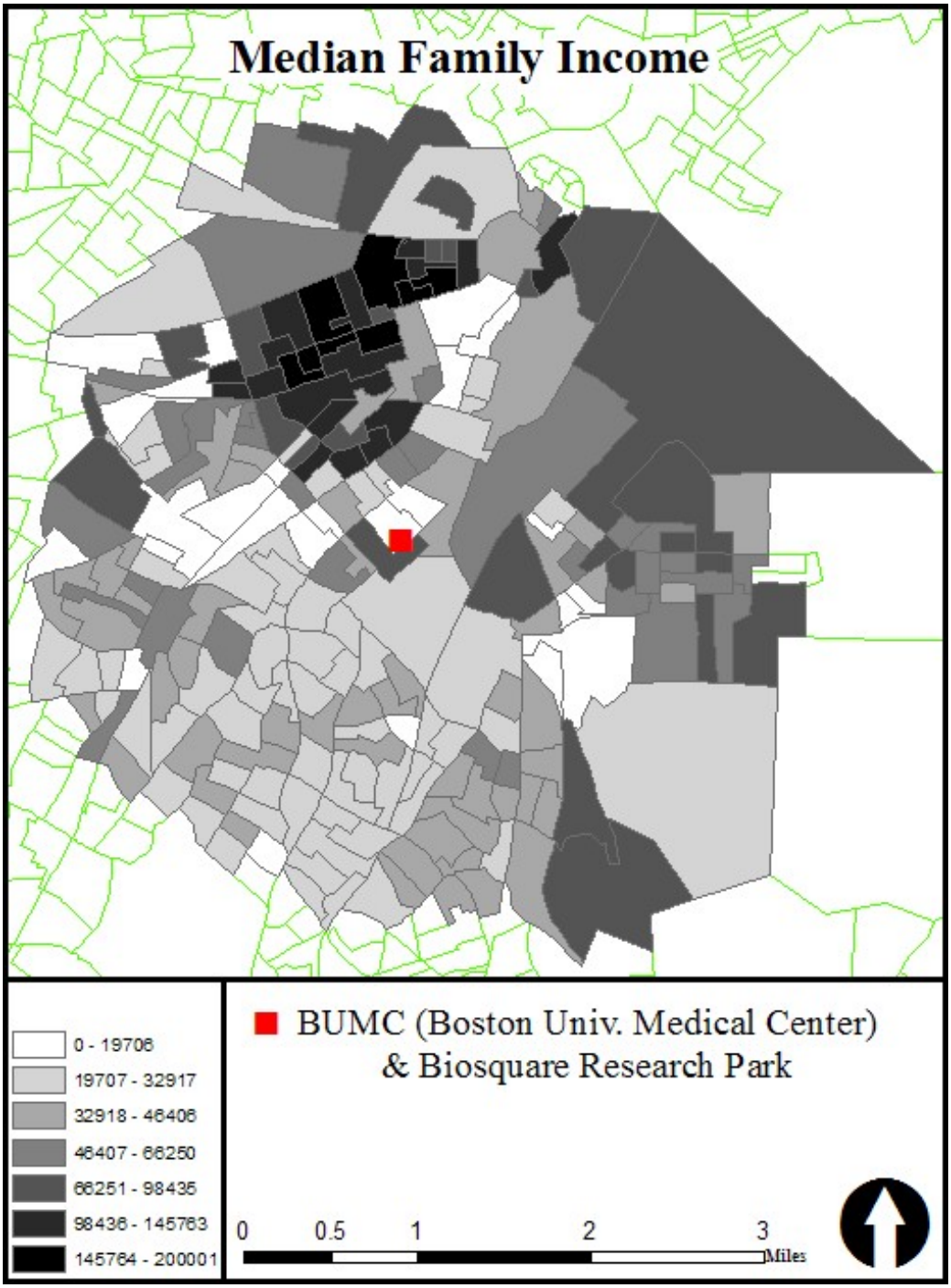

Figure IV-94. Distribution of Median Family Income across the Block Groups surrounding BUMC.

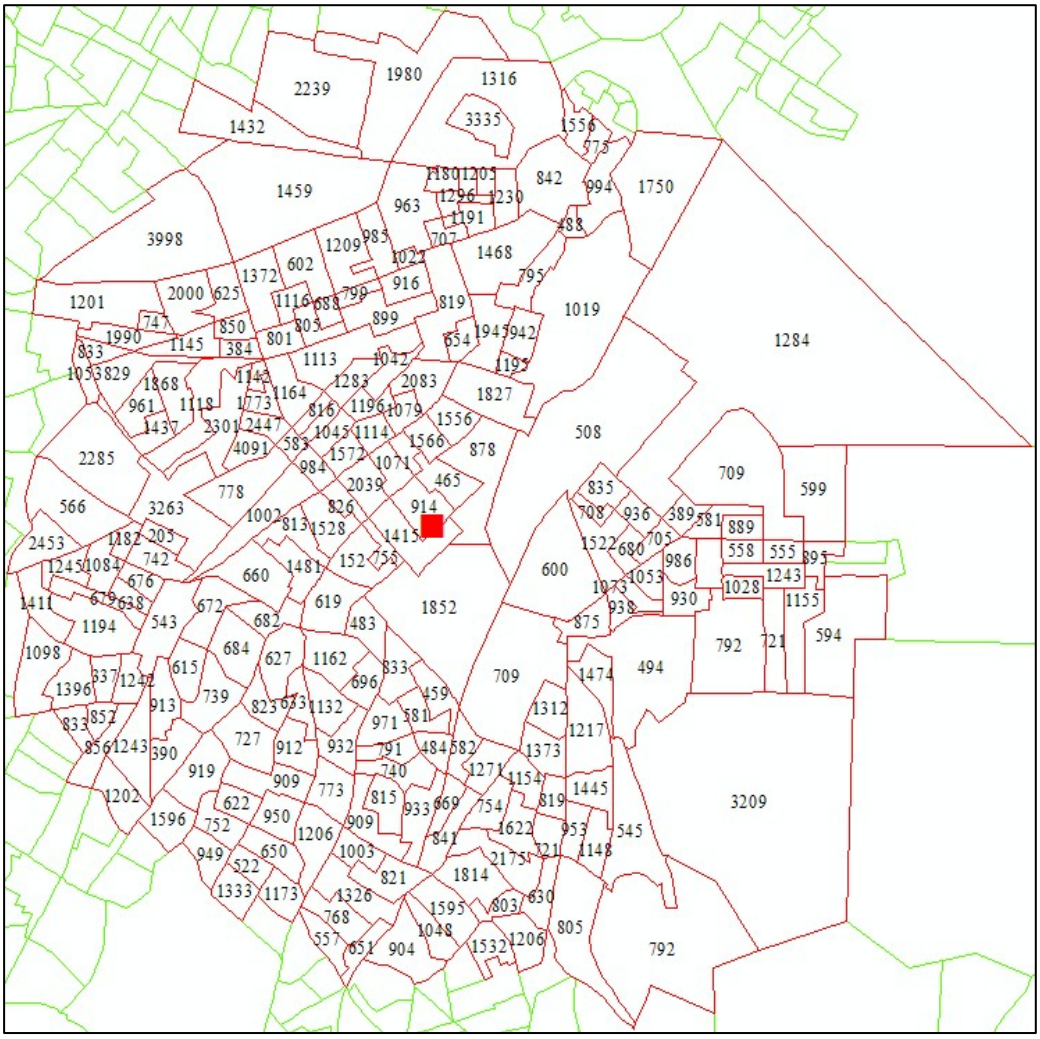

Figure IV-95. Population by Block Group (Actual Number) Surrounding BU Medical Center. Source: U.S. Census 2000.

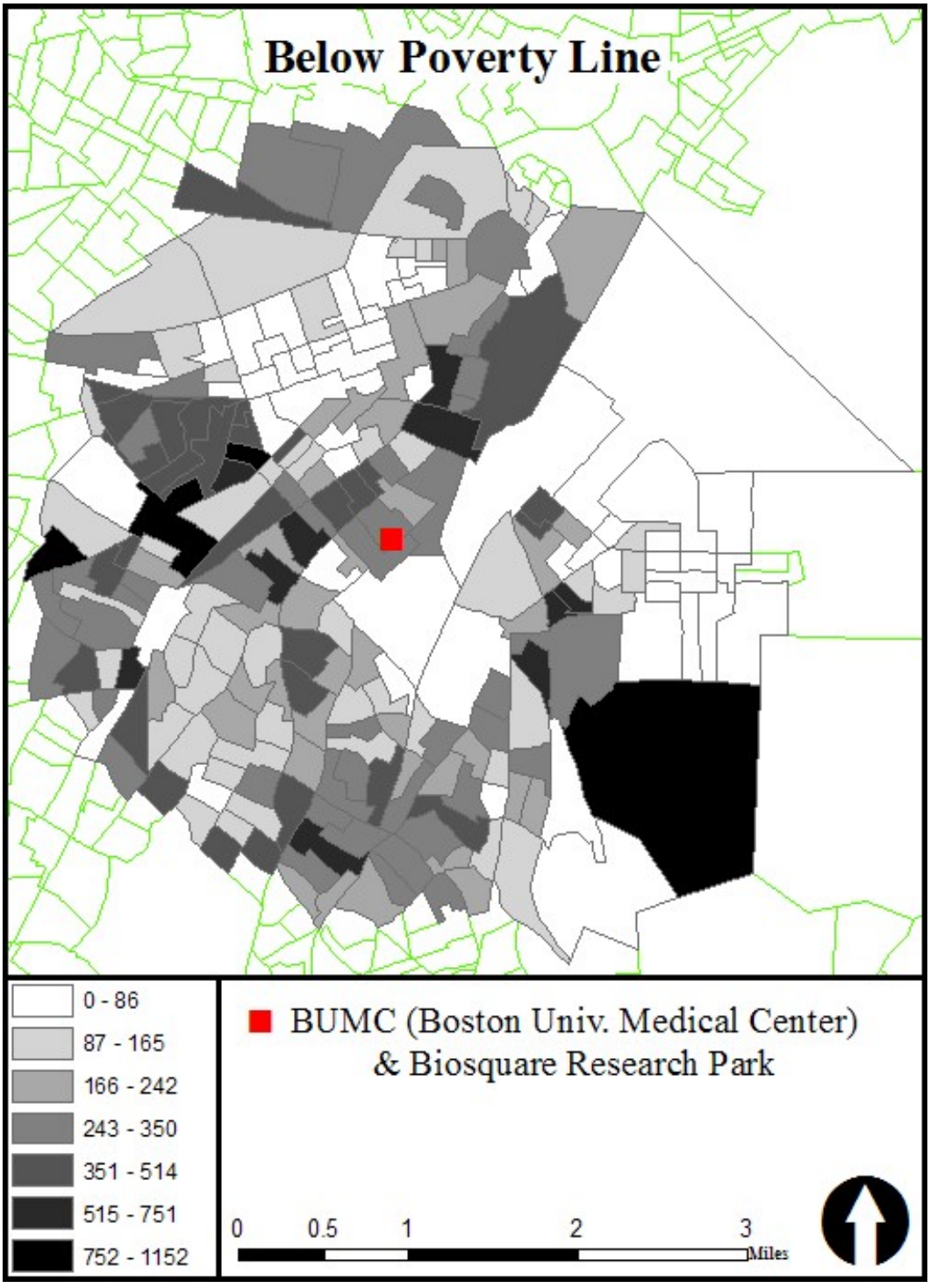

Figure IV-96. Individuals living below the poverty line in Block Groups surrounding BUMC.

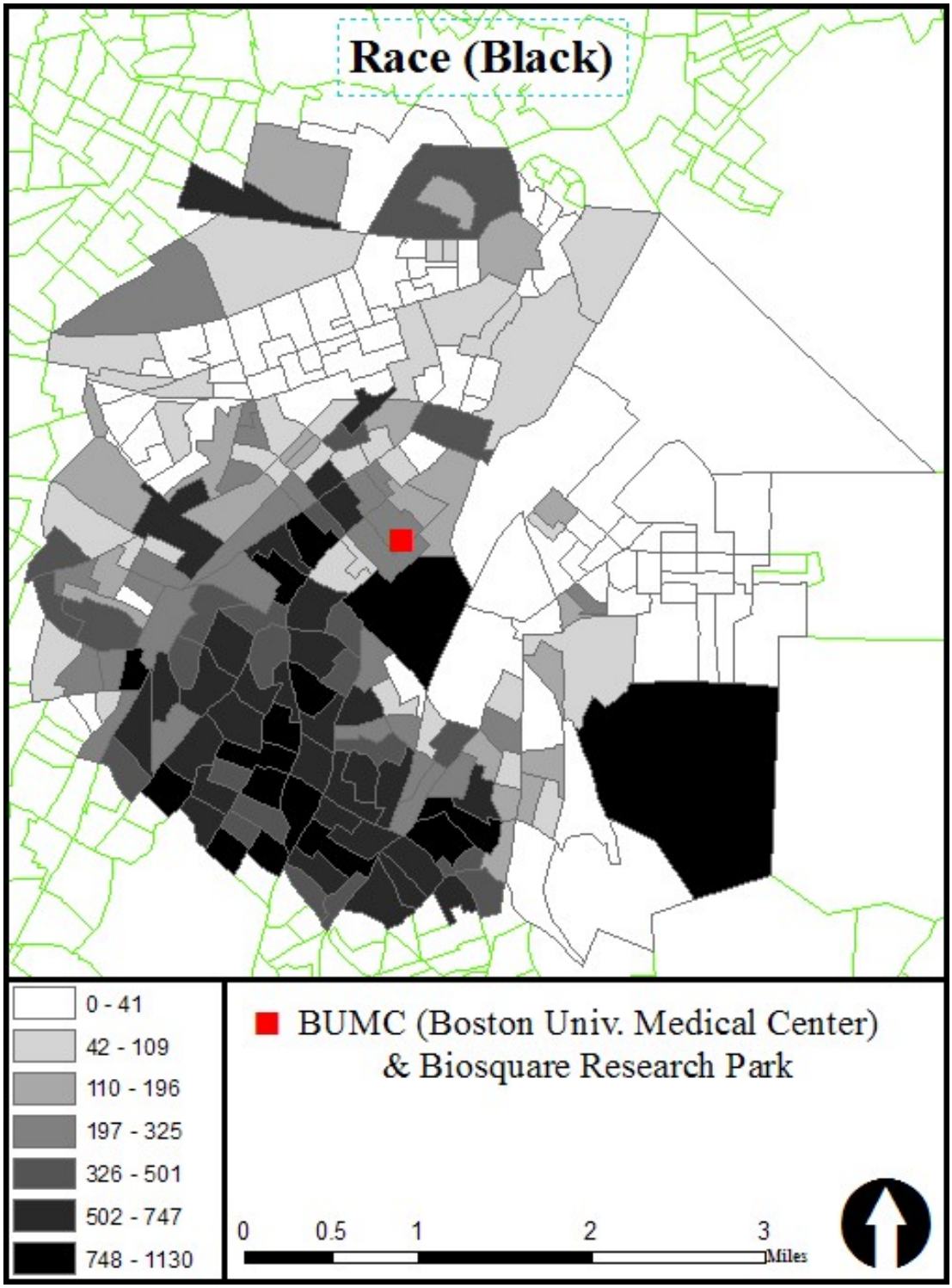

Figure IV-97. Distribution of individuals describing themselves as Black in the Block Groups surrounding the BUMC.

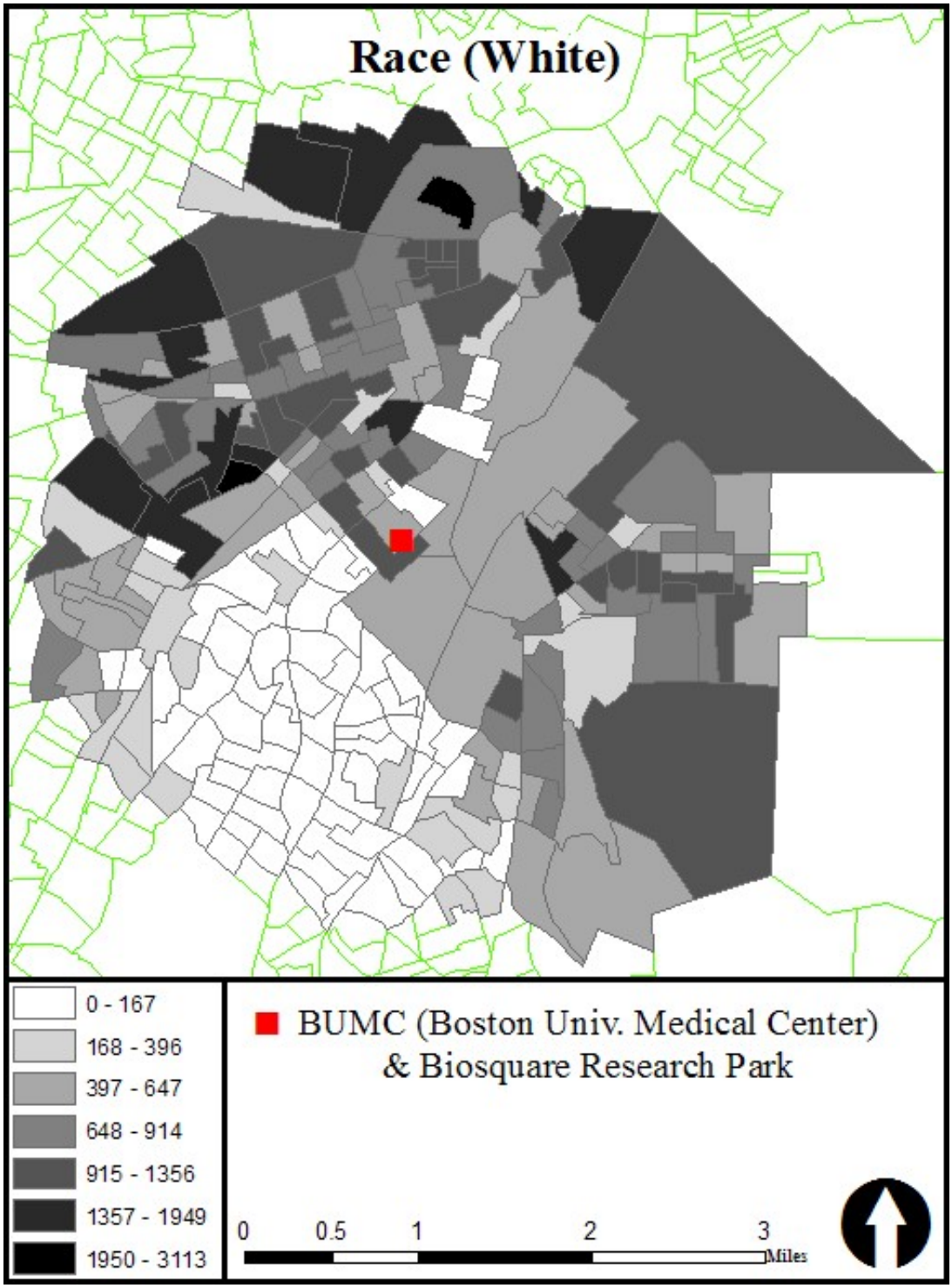

Figure IV-98. Distribution of individuals describing themselves as White in the Block Groups surrounding the BUMC.

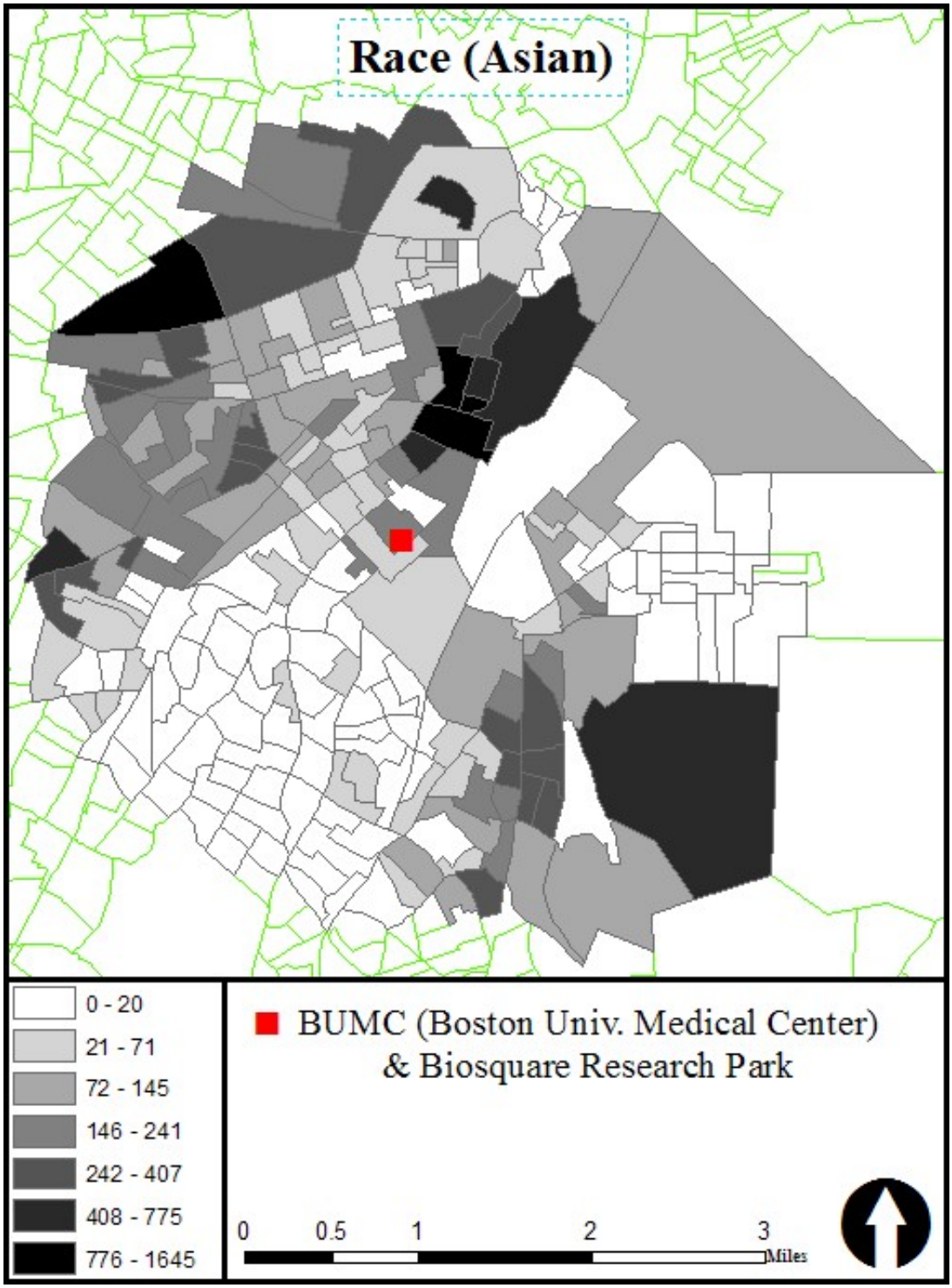

Figure IV-99. Distribution of individuals describing themselves as Black in the Block Groups surrounding the BUMC.

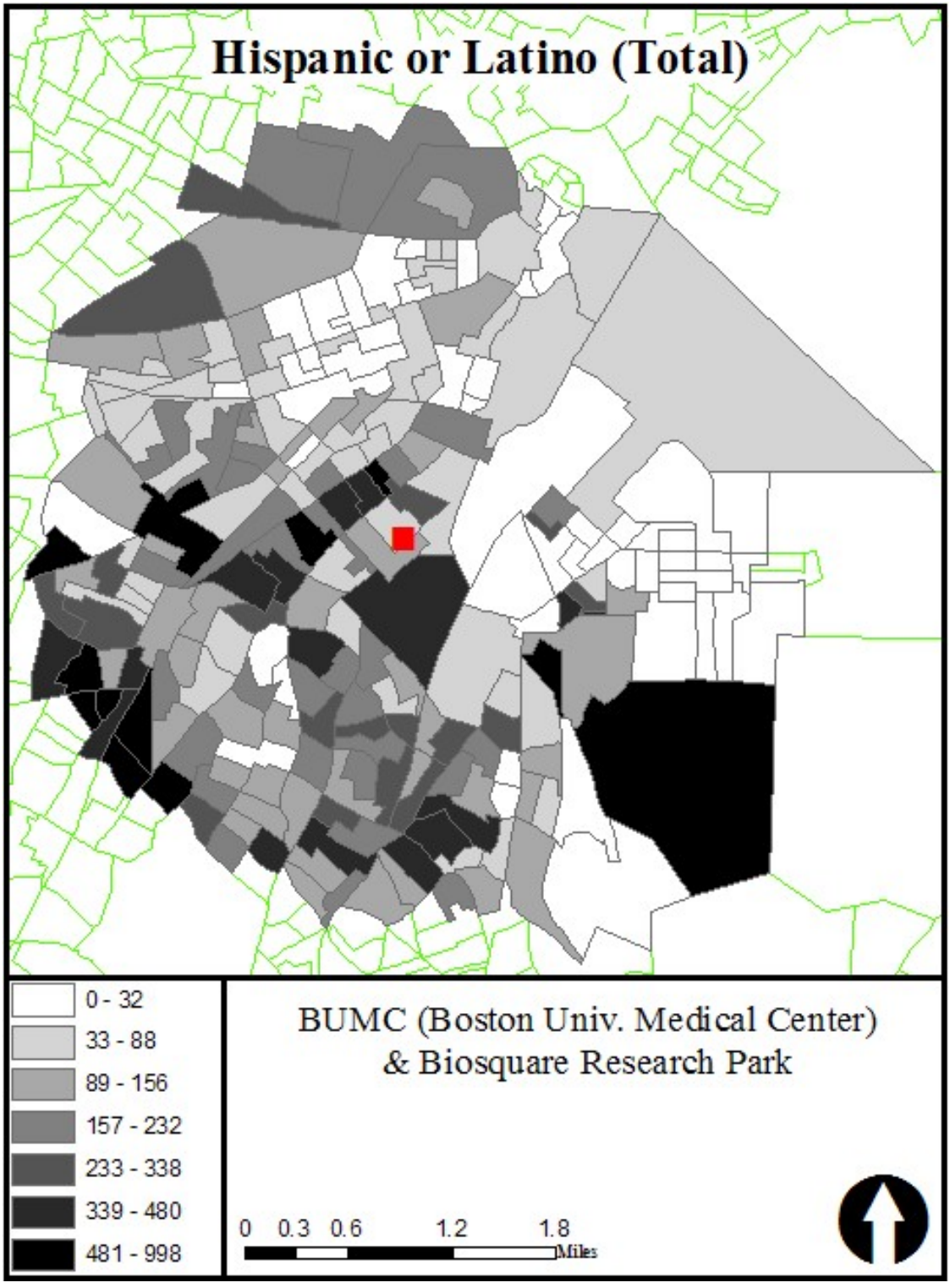

Figure IV-100. Distribution of individuals describing themselves as Hispanic/Lantino in the Block Groups surrounding the BUMC.

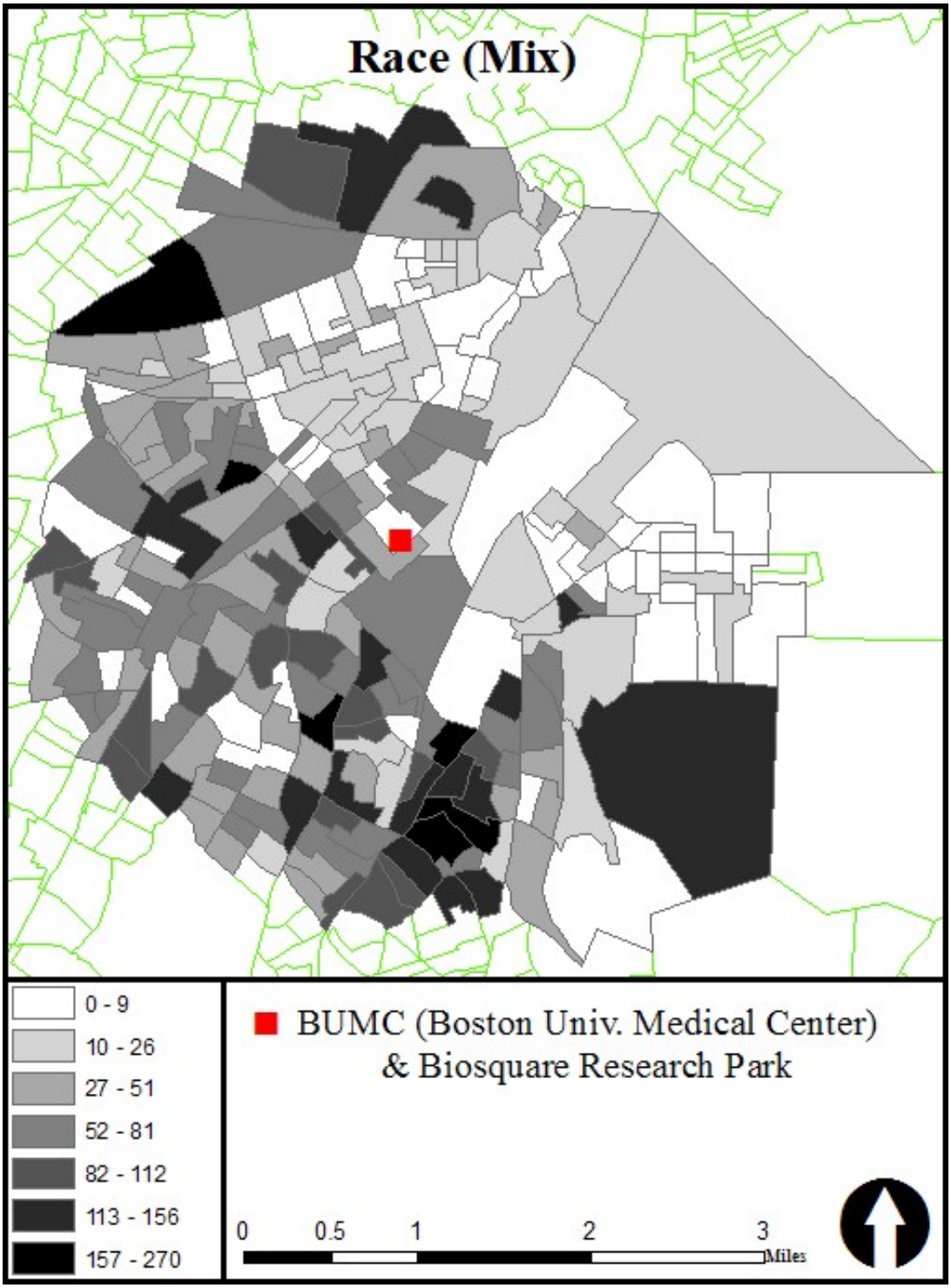

Figure IV-101. Distribution of individuals describing themselves as being of Mixed Race in the Block Groups surrounding the BUMC.

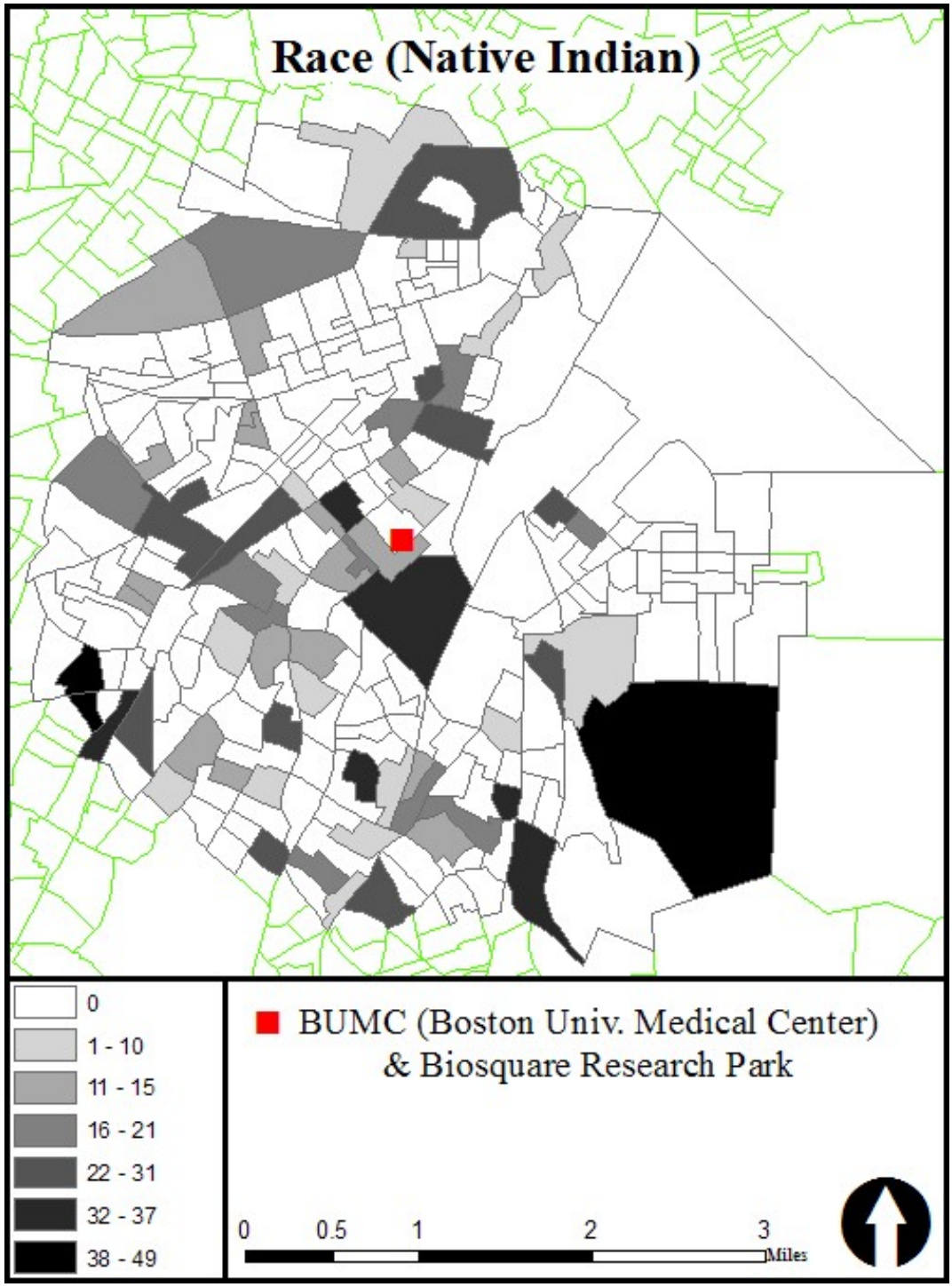

Figure IV-102. Distribution of individuals describing themselves as being Native Indian in the Block Groups surrounding the BUMC.

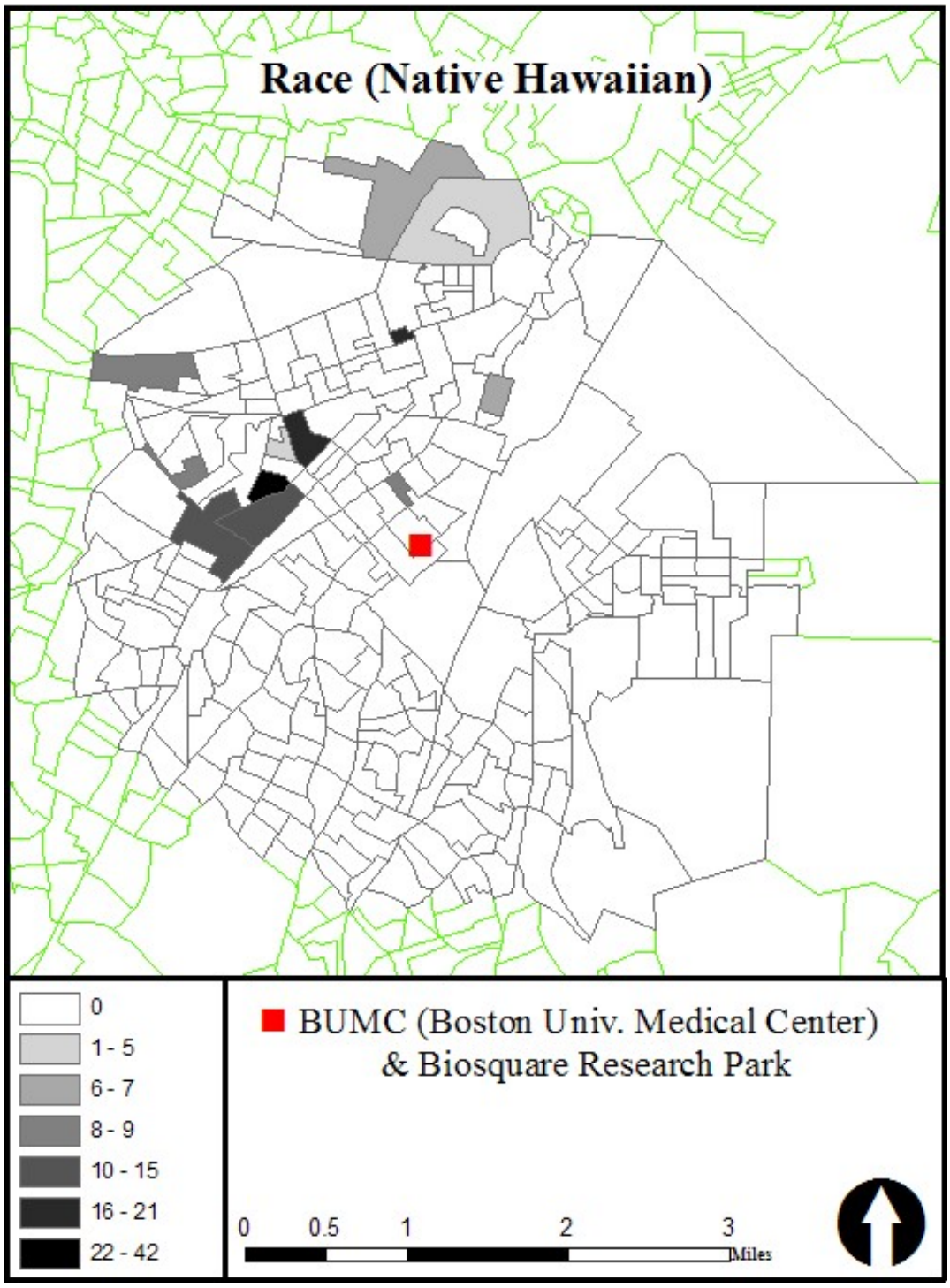

Figure IV-103. Distribution of individuals describing themselves as Native Hawaiian in the Block Groups surrounding the BUMC.

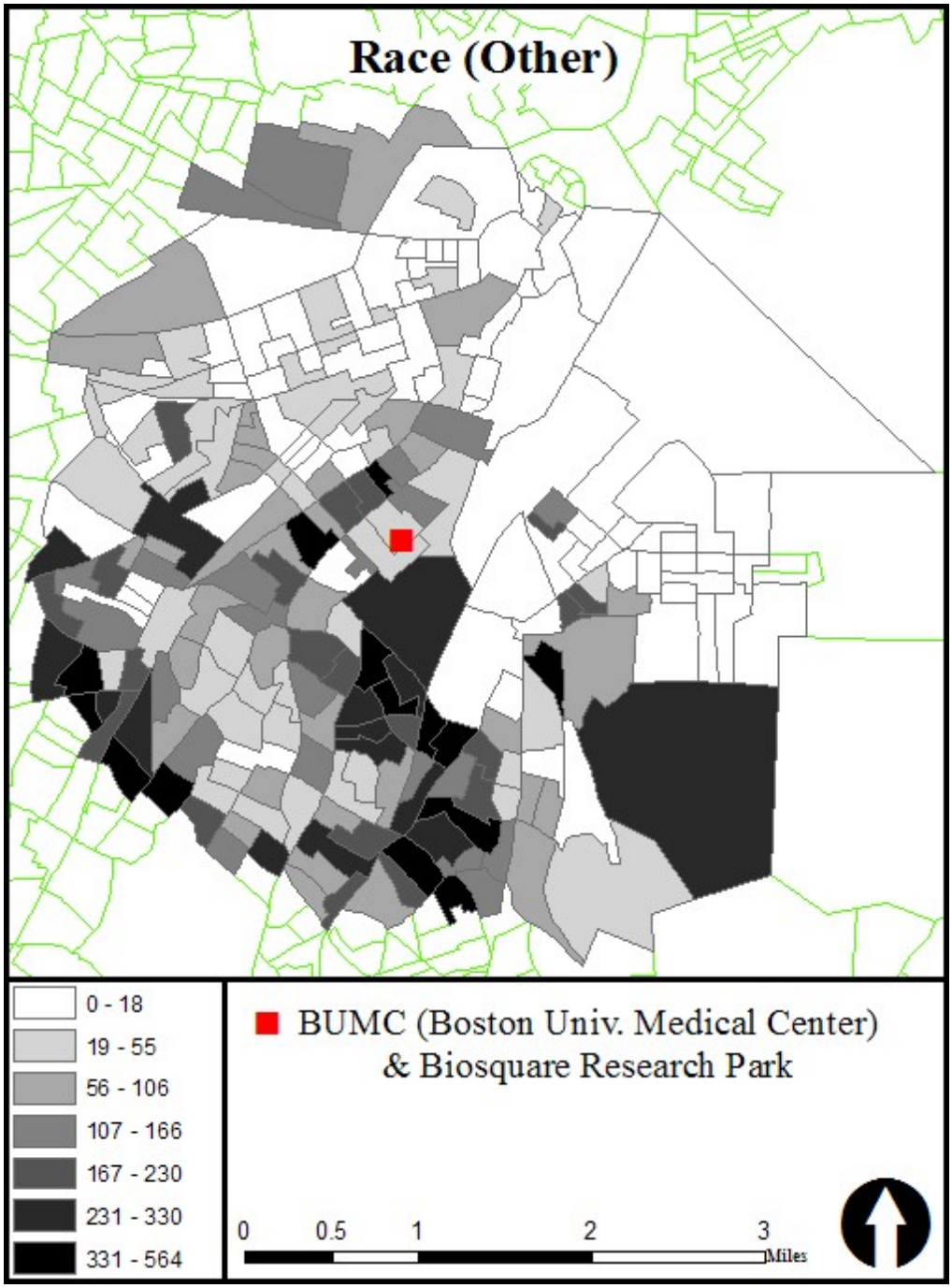

Figure IV-104. Distribution of individuals describing themselves as Other Race in the Block Groups surrounding the BUMC.

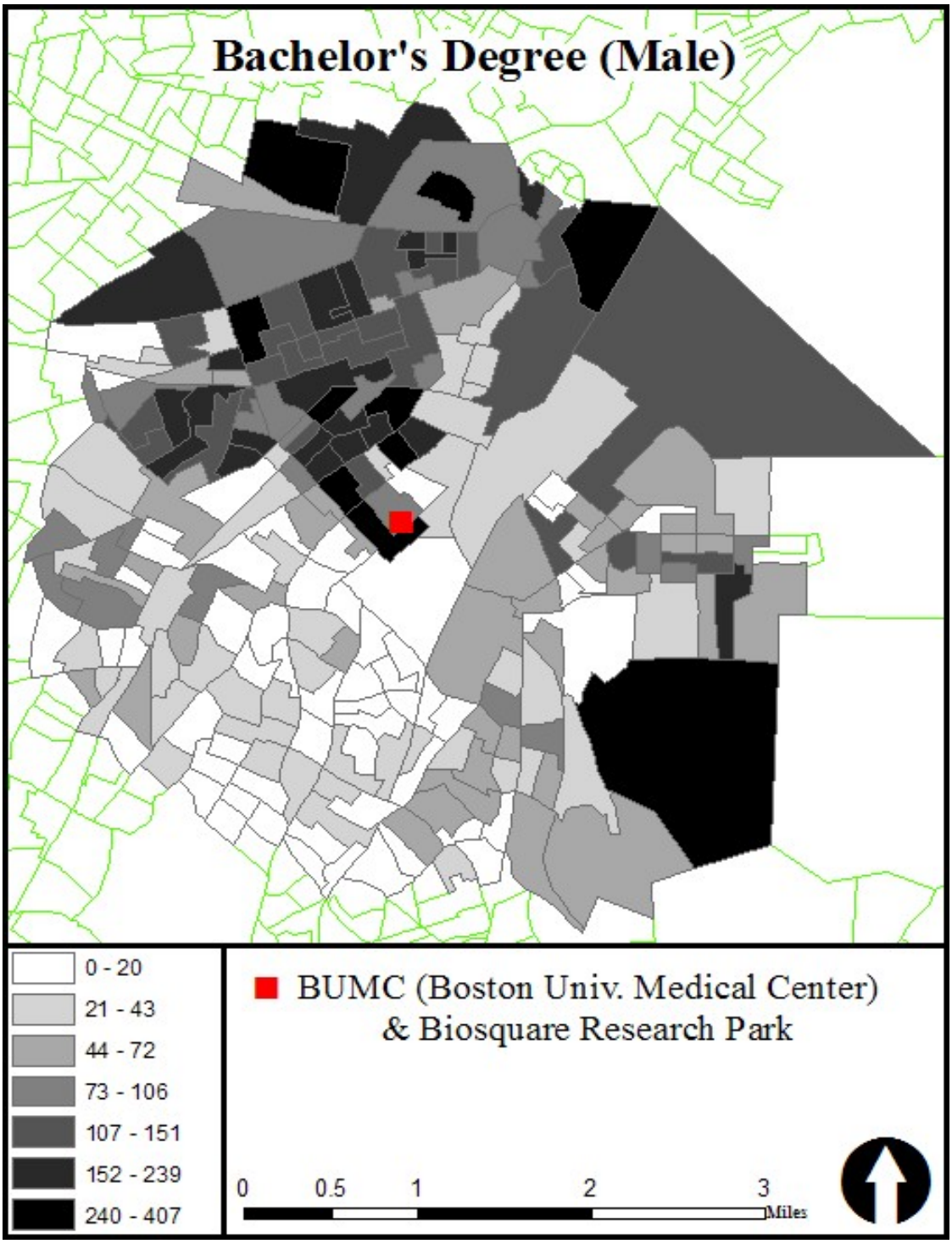

Figure IV-105. Distribution of individuals (male) having a four-year college degree or higher in the Block Groups surrounding BUMC.

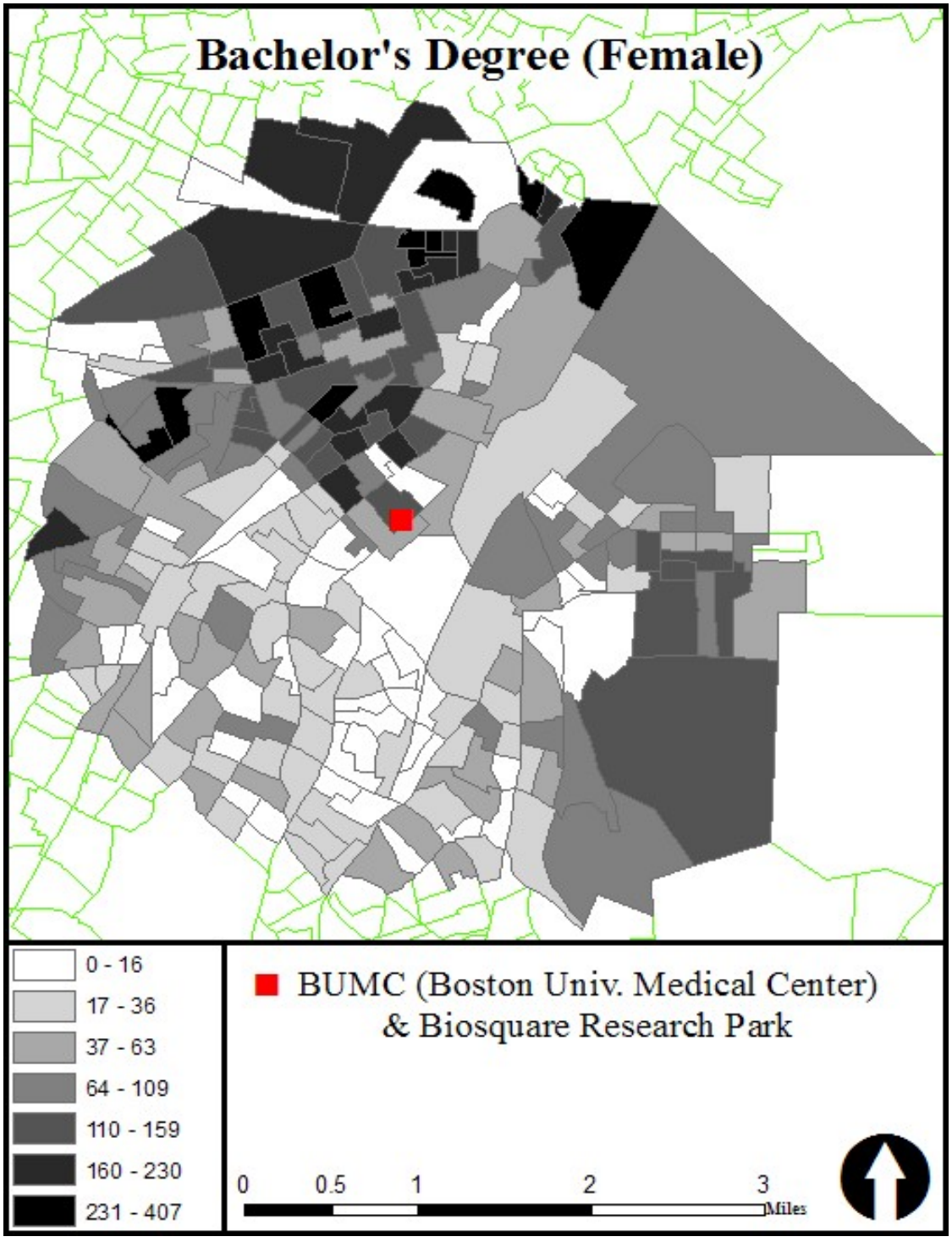

Figure IV-106. Distribution of individuals (female) having a four-year college degree or higher in the Block Groups surrounding BUMC.

Healthcare Facilities, Social Assistance and Emergency Response

Boston has some of the finest institutions of higher education. The region has generated a tremendous concentration of science- and technology-related research and development (University of Massachusetts, 2004). There are 22 hospitals and 35 colleges and universities within Boston's city limits (BRA, 2002). Social programs and assistance is widely available with ample primary and secondary schools. Many are located within the BGs surrounding the proposed NEIDL site.

*Boston Metropolitan Medical Response System (*MMRS)

Boston has a sophisticated, cooperative, multi-agency emergency response system. The Boston MMRS develops and exercises plans to mitigate the medical consequences of a weapons of mass destruction (WMD) event by creating a highly trained, readily deployable, fully equipped response system of medical, law enforcement, fire service & other professionals to support local resources. These resources and plans will be used to respond to any major medical incident affecting large numbers of people.

Many activities are underway as part of the Boston MMRS:

- An interagency management team has been established - including officials from the Boston Public Health Commission (BPHC), the BPHC Communicable Disease Control Bureau (CDC), Boston Police and Fire Departments, Boston EMS, Boston Emergency Management Agency, United States Department of Veteran's Affairs, Massport Police and Fire Departments, the MBTA Police, the Conference of Boston Teaching Hospitals, representatives of metro-Boston's community and neighborhood health centers, and numerous academic institutions.
- Cooperative partnerships are in place with many of Boston's schools of pharmacy, public health, and medicine
- Advanced Personal Protective Equipment (PPE) is in place for response personnel. This PPE will allow responders to remain safe during a weapons of mass destruction event
- Boston's local pharmaceutical cache is in place, ready for deployment in response to an act of terrorism involving chemical or biological weapons
- Syndromic surveillance program in operation through BPHC CDC. This web-based surveillance system monitors daily volume at 10 acute care hospitals, one community health care center, and call-code volume data from Boston EMS and the Massachusetts Poison Control Center, ensuring that, subsequent to a release of a biological or chemical agent, BPHC can rapidly detect changes in healthcare seeking patterns and mount an effective and coordinated investigation and response.
- Expanded citywide personnel training, including:
    - All EMS personnel trained to Hazardous Materials Operations level
    - All EMS personnel trained to Department of Justice Weapons of Mass Destruction Technician

- 40 EMS personnel trained to Hazardous Materials Technician
- Pilot Hazardous Materials for Hospital Providers course underway, specifically addressing issues of hospital-based care for patients involved in hazardous materials and weapons of mass destruction incidents
- Pilot MMRS Volunteer Responder course underway, preparing volunteer students from Boston's pharmacy, public health, and medical schools to participate in response to a WMD event or other large-scale emergency

The Boston MMRS continues to cultivate partnerships in Boston's expansive medical community.

Boston University Medical Center

Boston Medical Center is a private, not-for-profit, 581 licensed bed, academic medical center and is the primary teaching affiliate for Boston University School of Medicine. Boston Medical Center is the largest safety net hospital in New England providing a full spectrum of pediatric and adult care services, from primary to family medicine to advanced specialty care. A safety net hospital is one that provides free care to working individuals and families who are not eligible for coverage through a government program like Medicaid or Medicare, and who do not get health insurance through their employers. Boston Medical Center is also the largest 24 hour Level I trauma center in New England with more than 128,005 Emergency Department visits last year. There is a full complement of support services available. The Medical Center is fully accredited by the JCAHO.

Expert Consultation . The Infectious Disease Section of the Adult Department of Medicine provides Fellow and Attending physician coverage for expert consultation 24 hours per day. These specialists are available to respond in the event a NEIDL worker becomes ill. Likewise, Pediatric Infectious Disease Attending physicians from the Pediatric Infectious Disease Section of the Department of Pediatrics are available 24 hours per day.

Facility Isolation Capabilities. BMC has 60 negative flow rooms scattered through out the institution. Five of these rooms are located in the Emergency Department. Air to the patient rooms is supplied by general purpose air handlers that have 95% (MERV 15) efficiency filters. Exhaust is served by dedicated exhaust fans that are not filtered at this time. BMC isolation rooms do not include anterooms however; procurement of several portable anterooms, with negative flow and HEPA filtration capabilities is in progress.

Radiology Services. BMC's radiology department is open and staffed by technicians to complete the studies and radiologists to interpret the results 24 hours per day. Radiology suites are located on both inpatient campuses and have mobile capabilities to accommodate portable X-rays for patients requiring continuous isolation.

Laboratory Services. BMC is a Level 2 Biosafety Lab with service availability 24 hours per day. In addition, BMC is a designated Level A Support lab for the Massachusetts State Laboratory. Discussions are currently underway to upgrade BMC laboratory services to a BSL 3 level.

Transmission Prevention. The completion of equipment procurement for all weather decontamination outside of the facility has made the existing fixed decontamination room available for use as a biological entry, triage, and containment area equipped with separated air flow, negative pressure capability, direct external access, and medical gases. Procurement of additional biological containment and transport equipment is in progress. Annual Infection control training is mandatory for all BMC staff.

Emergency Preparedness and Response Plans. Response to an accident or exposure in the BSL 4 lab will be modeled following the current BUMC BSL 3 procedures (Appendix A). Event response requirements are expected to be organism specific therefore an agent specific treatment algorithm is developed for each research agent. Single or small volume casualty or illness clusters are managed at BMC using theReferral of Contagious Illness Plan and Transmission Based Precautions. These will be the primary plans used in the event of an employee exposure/illness in the BSL 4 Lab. If the magnitude of the exposure/illness requires a larger scale response from the hospital, the Biological Emergency Plan along with the Mass Illness Screening Process, and Mass Prophylaxis Algorithm can be activated to manage containment, isolation, force protection, screening, prophylaxis and resource management for the event.
In the event of contamination requiring decontamination BMC will activate the All Hazards Decontamination Plan. Decontamination procedures are carried out by a fully equipped and trained decontamination team.

Planning, Preparedness and Exercise Activities. Boston Medical Center participates in multidisciplinary, inter-departmental planning for emergencies. BMC's planning activities include active participation in and plan integration with regional and state entities.

- Conference of Boston Teaching Hospitals Disaster Committee
- Region 4 C Surge Committee
- UASI Region Homeland Security Committee
- Metropolitan Medical Response System Committee
- Local Emergency Planning Committee
- Massachusetts State Surge Committee

The following Mutual Aide Agreements are in place:

- MMRS – Boston Hospitals: Share services, staffing, and supplies.
- Lemuel Shattuck Hospital – Capacity – Isolation specialty
- Quincy Medical Center – Capacity
- Boston Fire Department – Decontamination

- Massachusetts Department of Public Health – Regional benchmarks for preparedness, laboratory support, NDMS participating hospital
- CDC Quarantine Center Boston Logan Airport – Designated Receiving Hospital
- Vendor contracts for critical supplies

Other resources available for emergency response include:

- Antibiotic Stockpile (20,000 courses)
- Isolation personnel protective equipment and supplies stockpile
- Inventory of 25 PAPR's – 3 sets of HEPA filtration cartridges are available for each unit. PAPR units are located in a central location in each In-Patient facility. Batteries are maintained on battery chargers in each location. Specialized training in Powered Air Purifying Respirator use for personnel in Emergency Department, Security, Anesthesia, and Decontamination team.

Boston Medical Center routinely participates in emergency response drills and exercises. The Center also has experience in responding to mass casualty events and disasters. See Table IV-21 for the most recent exercises and events.

BUMC emergency response activities are supported by the Boston Police Department. The new headquarters is equipped with perhaps the most advanced ID imaging and ballistics identification technology in the country; a DNA laboratory (one of only 18 departments in the country with in-house DNA testing capacity; and an enhanced 9-1-1, and a Computer-aided Dispatch system linked to Mobile Date Terminals. The Boston Fire Department has over 1400 uniformed personnel providing coverage for about 47 square miles and the Boston Emergency Medical Service has 300 emergency medical technicians providing state of the art pre-hospital care.

Table IV-21. Boston Medical Center Emergency Response Exercises and Events.

Date	Exercise/Event
4/05	Actual Fire at Perkin Elmer Inc.
3/05	IEMC Drill Functional exercise – Multi agency City wide mass casualty with facility damage at BMC
6/05	City Wide Live action exercise – Multi agency Operation Atlas – City wide mass casualty exercise
6/05	Actual Mass TB exposure
9/05	Actual Hurricane Katrina
9/05	Live Action Exercise Decontamination Drill
9/05	Table top exercise – Multi agency, multi jurisdictional Pandemic Influenza
11/05	Facilitated Exercise MedFlight Helicopter Crash Combined BU/BMC
3/06	Actual Chemical Exposure - Mallory
4/06	Live action exercise Decontamination- Radiation
5/06	Functional exercise Simulated Heat Emergency
6/06	Facilitated exercise – MassPort Quarantine and transfer of contagious illness arriving at Logan Airport
6/06	Actual Oxygen Interruption
6/06	Actual Loss of Steam
7/06	Live action Exercise In patient Unit Evacuation
7/06	Actual Flood
8/06	Table top exercise – Multi agency MassPort-CDC quarantine plan
9/06	City Wide Live Action exercise Mass Casualty - Radiation
9/06	Actual Cement Dust Exposure
9/06	Actual CO Exposure, Evacuation assisted living facility
9/06	Table top exercise – multi agency Pandemic Influenza

Educational Resources

The South End has a large number of elementary and secondary schools; junior colleges, 4 year colleges, and universities; professional schools, business schools and computer and management training schools and activities; technical and trade schools; as well as wide variety of educational support services. See Figures IV-105 through 109 for maps indicating the distribution of these educational resources across the BGs surrounding BUMC.

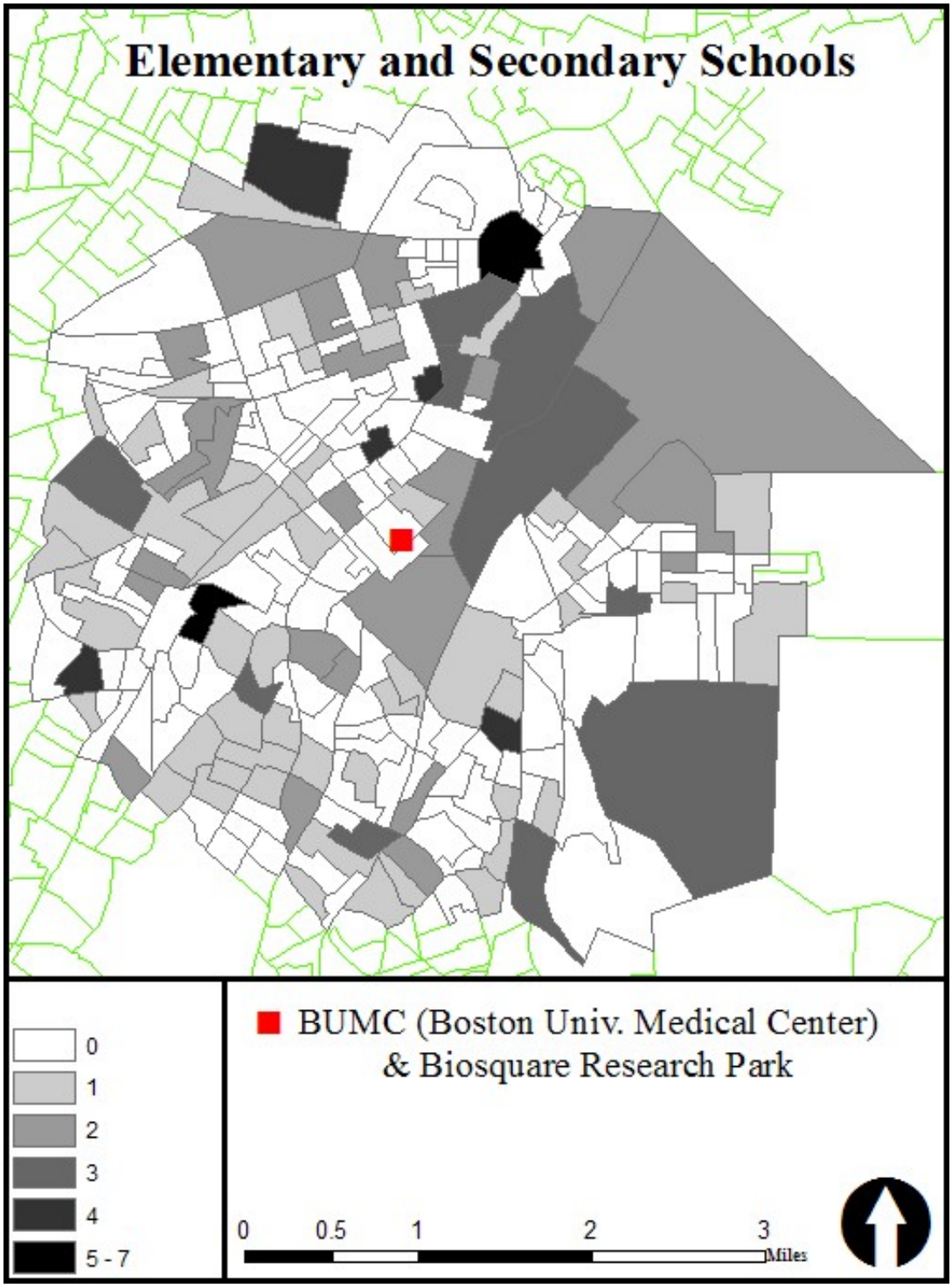

Figure IV 107. Distribution of elementary and secondary schools in the Block Groups surrounding BUMC.

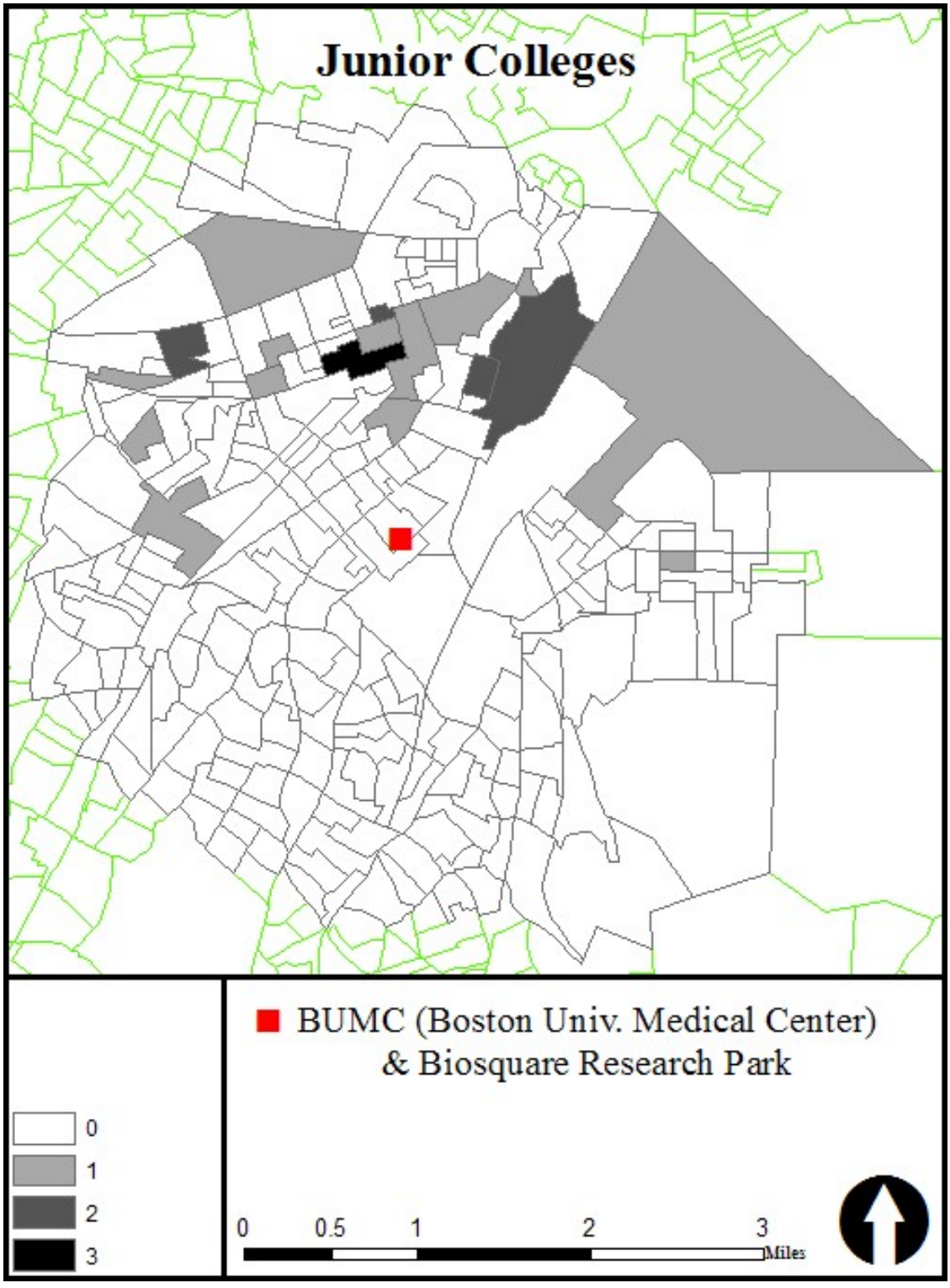

Figure IV 108. Distribution of junior colleges in the Block Groups surrounding BUMC.

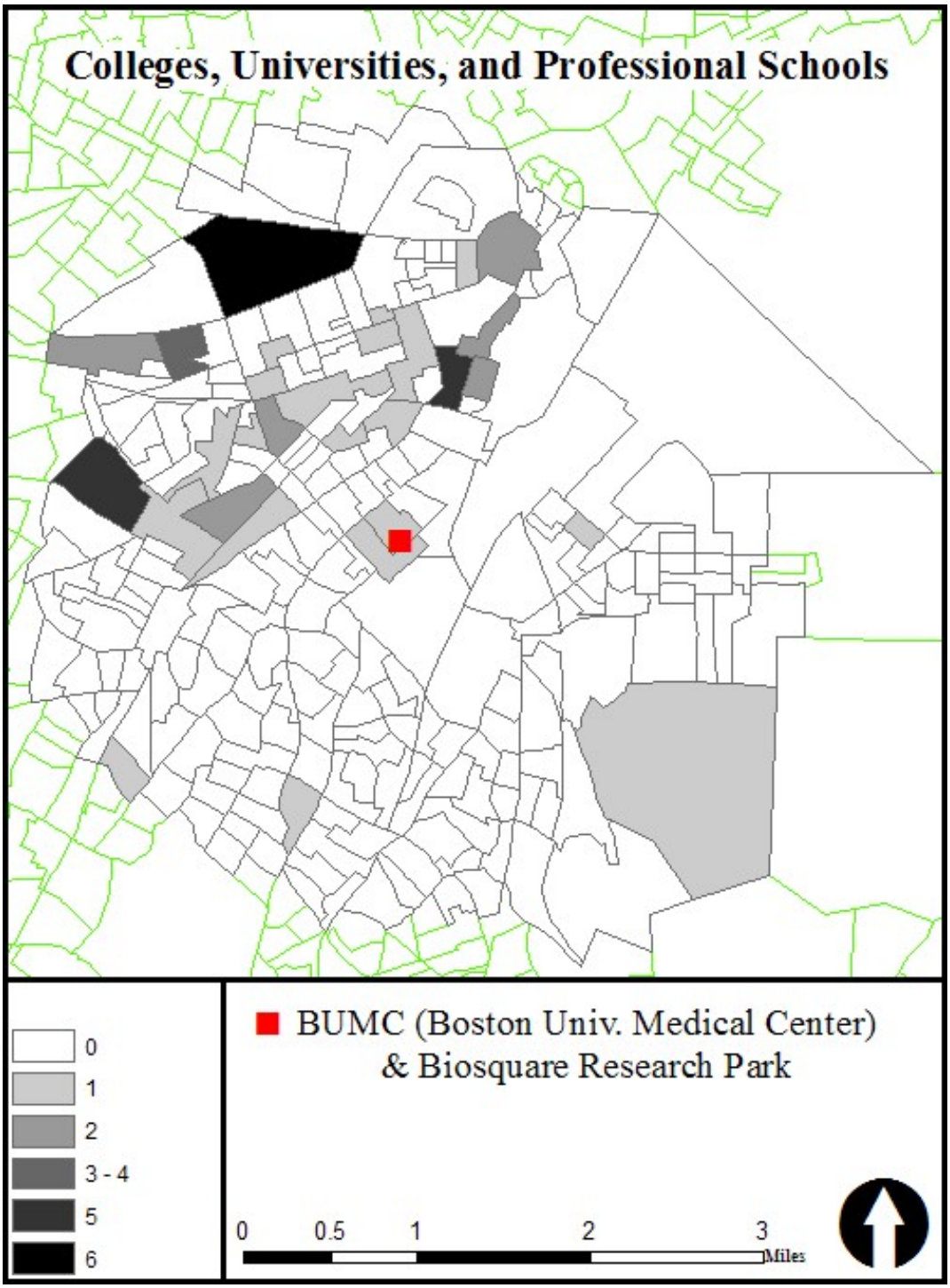

Figure IV 109. Distribution of colleges, universities and professional schools in the Block Groups surrounding BUMC.

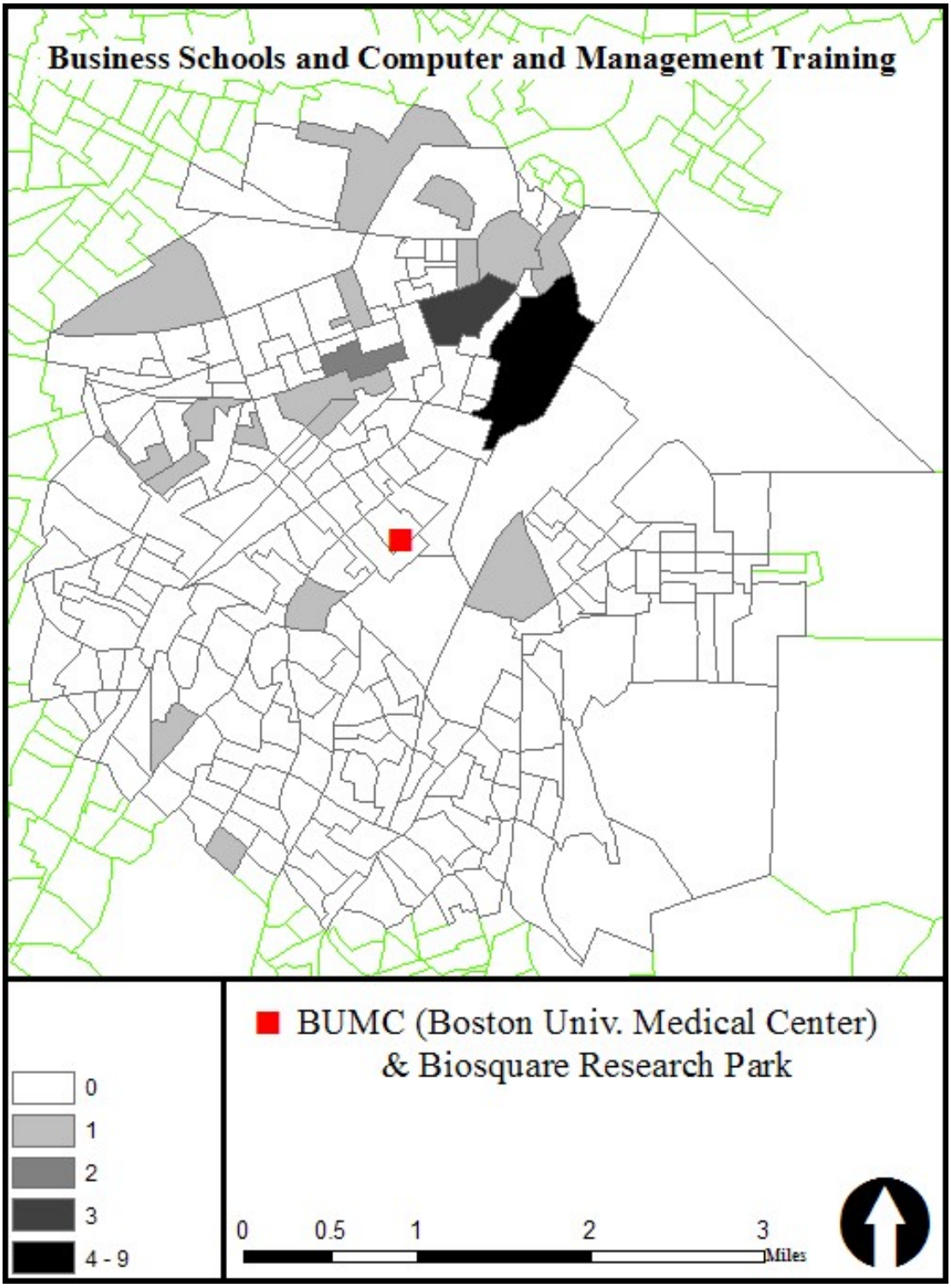

Figure IV 110. **Distribution of business, computer and management training schools in the Block Groups surrounding BUMC.**

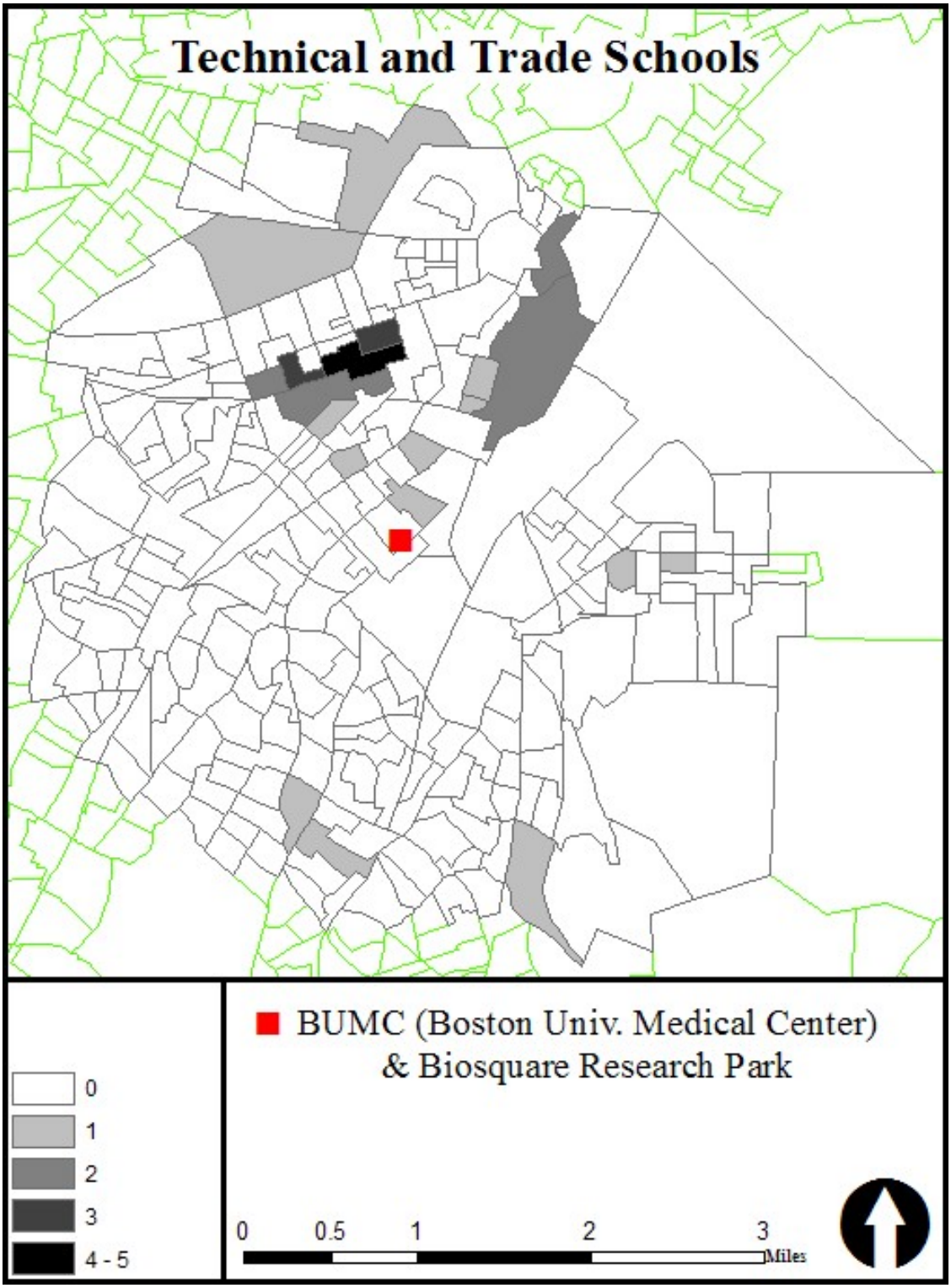

Figure IV 111. Distribution of technical and trade schools in the Block Groups surrounding BUMC.

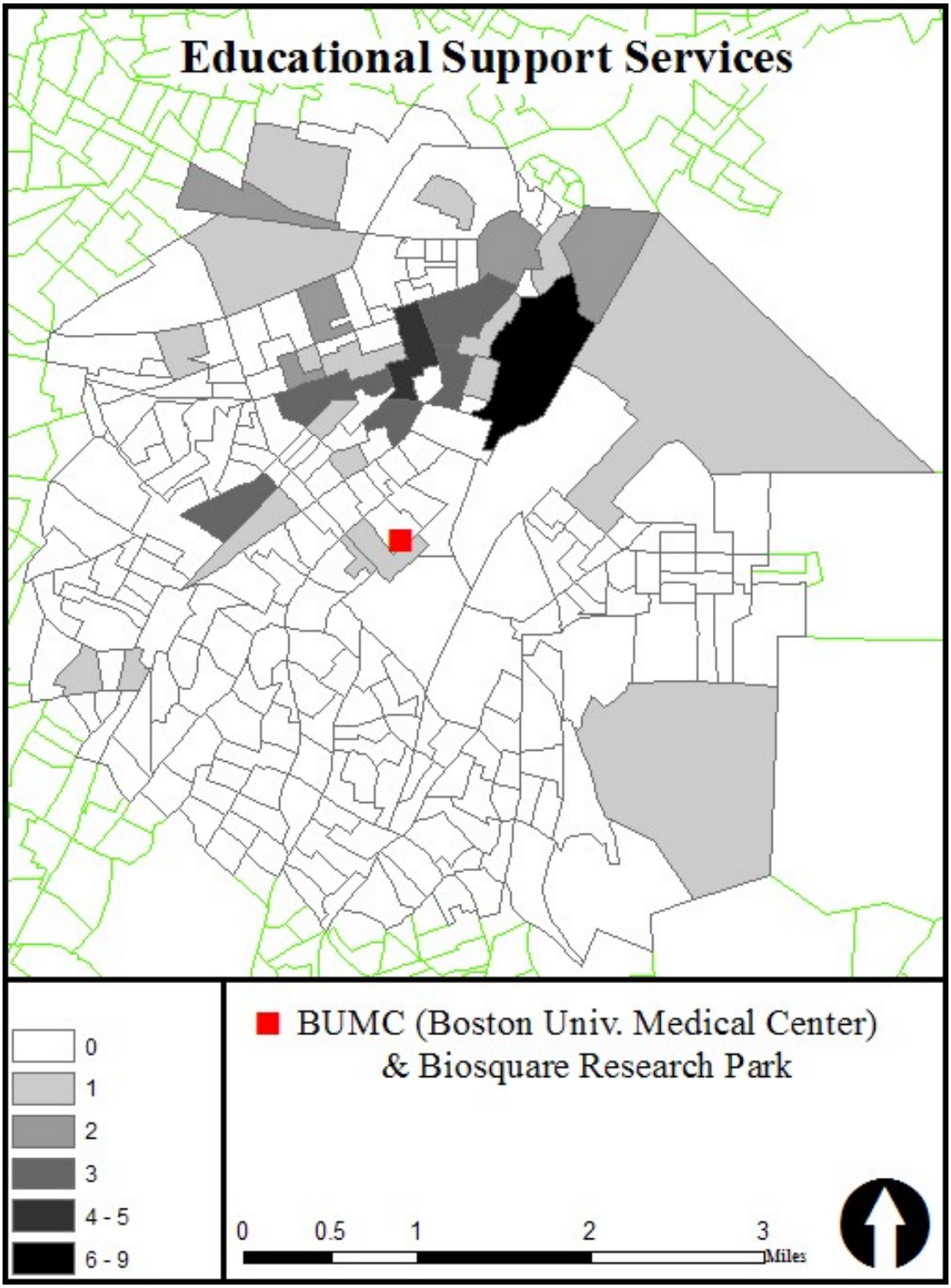

Figure IV 112. Distribution of educational support services in the Block Groups surrounding BUMC.

Other Social Assistance

Other social assistance and services available in the immediate area of consideration include many hospitals, ambulatory and healthcare services, nursing and residential care facilities, individual and family services; community food and housing, emergency and other relief services; vocational rehabilitation services; and child day care services. It is not anticipated that the additional personnel and families brought to the area by the NEIDL will tax the services available. Services included in this description have been sited within the BGs surrounding the proposed NEIDL site on the following maps in Figures IV-113 through 116.

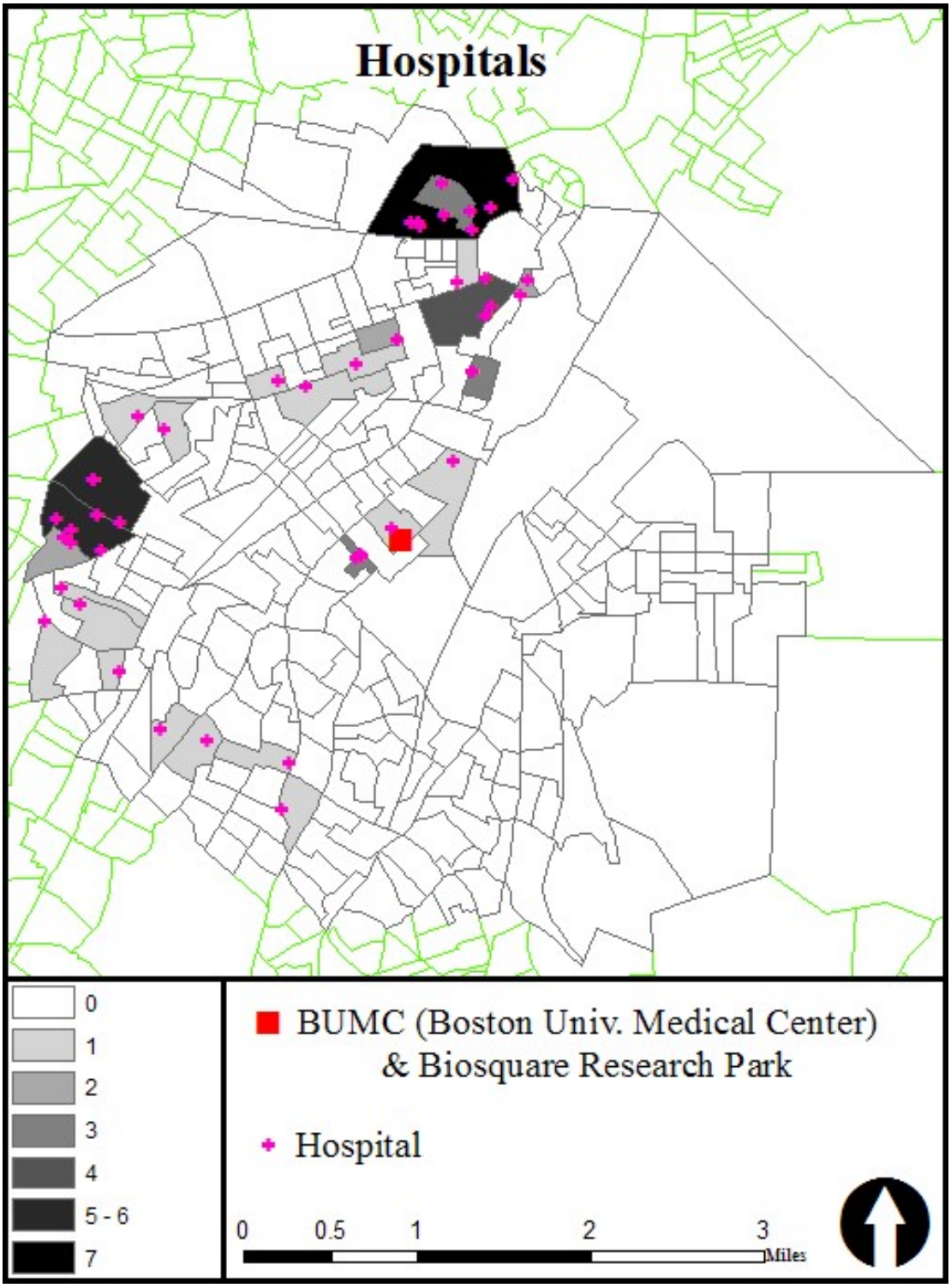

Figure IV-113. Distribution of hospitals in the Block Groups surrounding BUMC.

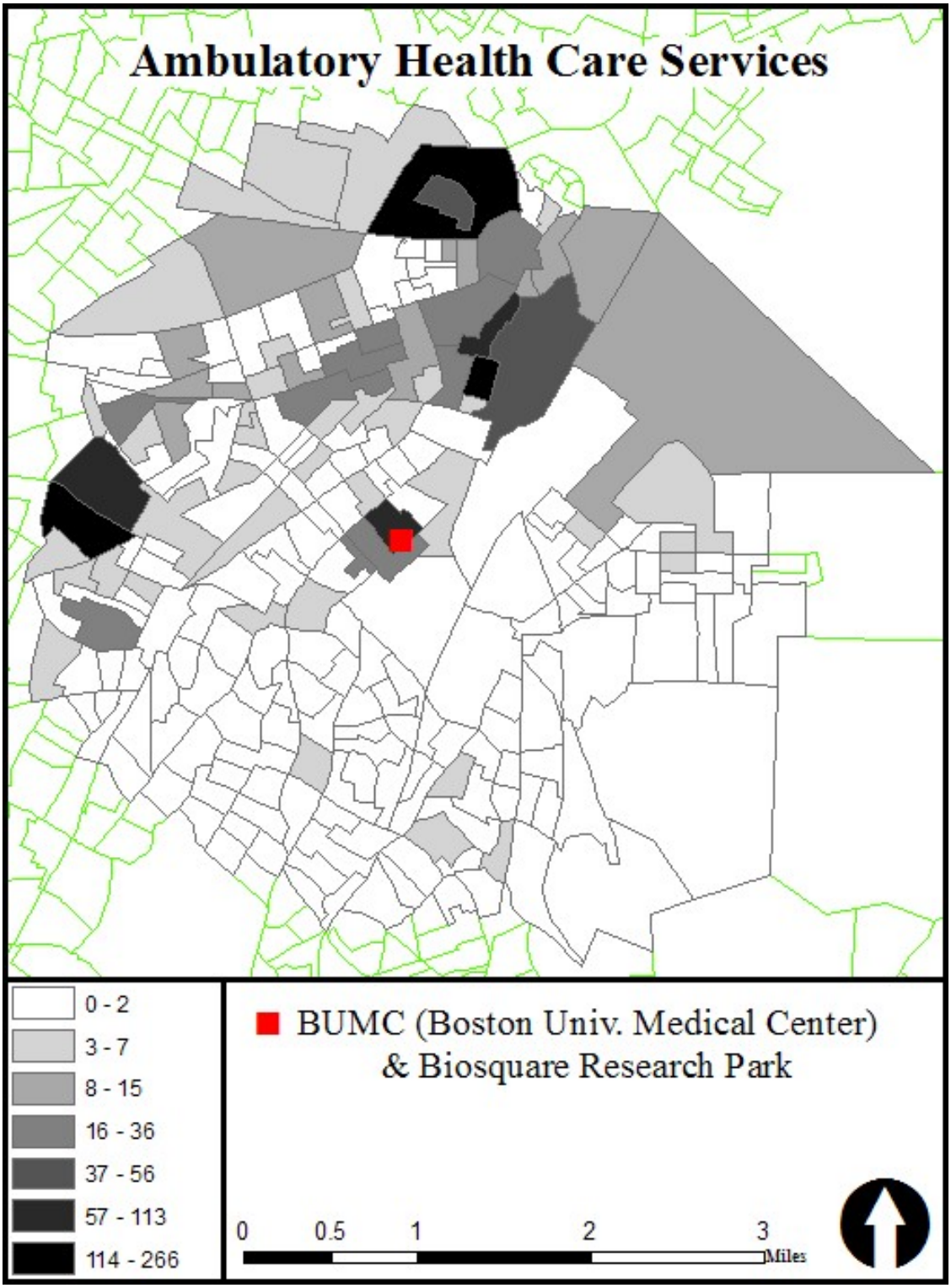

Figure IV-114. Distribution of ambulatory health care services in the Block Groups surrounding BUMC.

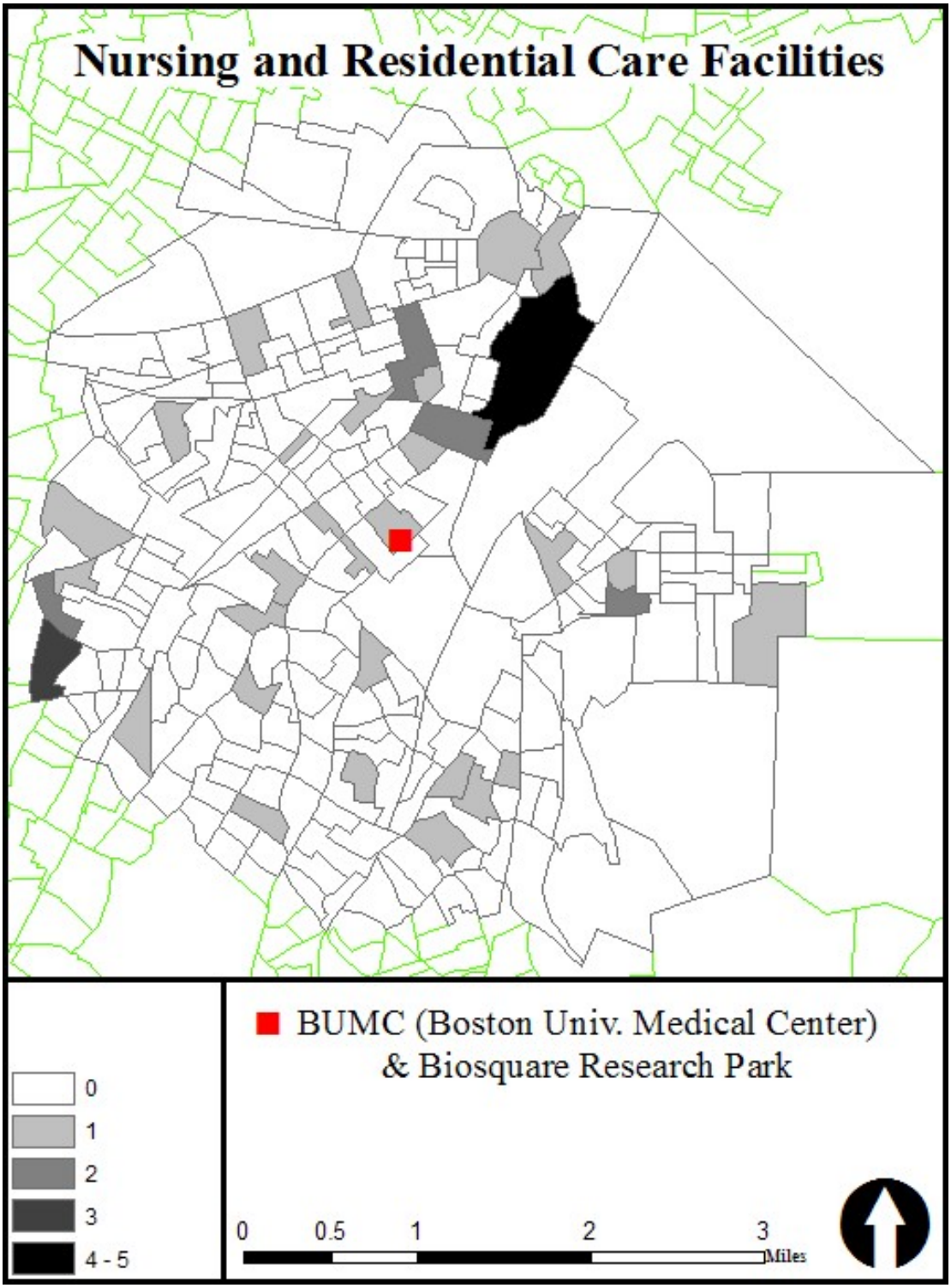

Figure IV-115. Distribution of nursing and residential care facilities in the Block Groups surrounding BUMC.

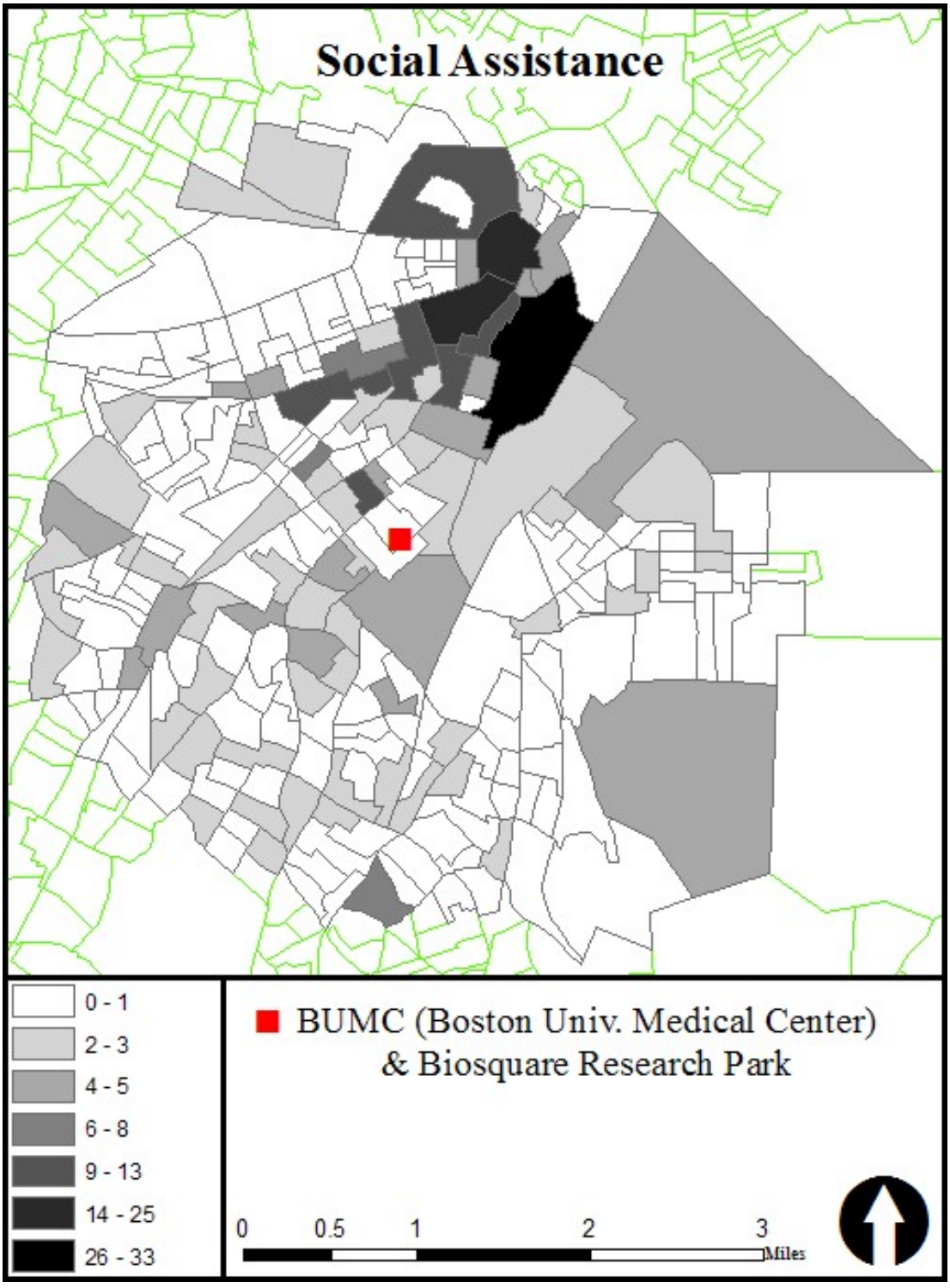

Figure IV-116. Distribution of other social services in the Block Groups surrounding BUMC. These services include individual and family services; community food and housing; vocational rehabilitation services; emergency and other relief services; and child day care services

Floodplains

Executive Order 11988 requires that the Project be assessed to determine if activities would occur within a floodplain. According to the Federal Emergency Management Agency (FEMA) National Flood Insurance Program Flood Insurance Rate Map (FEMA, 1983), the site is not located within a 100-year flood zone and therefore no impacts to such resources would result from the Project. The proposed Boston-NBL facility site would not be located within a 100-year flood plain and therefore requirements of Executive Order 11988 do not apply.

Wetlands, Riperian Areas and Surface Waters

The DHHS General Administration Manual (U.S. DHHS, 2000) defines wetlands as those areas inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support and, that under normal circumstances do support, a prevalence of vegetation or aquatic life that require such conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs and similar areas. Executive Order 11990, Protection of Wetlands, 42 CFR 2691 (1977) as amended by Executive Order 12608, 52 FR 34617 (1987), and 42 U.S. Code 4321 direct each federal agency to minimize destruction, loss or degradation of wetlands and to preserve and enhance such wetlands in carrying out their program responsibilities. Consideration must include a variety of factors such as water supply, erosion, and flood prevention, maintenance of natural systems and potential scientific benefits.
The Project site is located in a developed area and there are no surface water bodies or wetland areas in the general vicinity.

Habitat, Wildlife and Vegetation

Of the open space on the BUMC site, roughly 50% is asphalt-paved and 50% is hard-packed gravel. The site is currently used for vehicle parking. The site's limited vegetation consists of weeds. The BUMC Albany Street site is not located near any surface waters and thus would have no impact on fish resources. It is located in an urban area and does not contain any natural vegetation or landforms.

Agriculture- Livestock

According to the Massachusetts State and County Data-2002 Census of Agriculture (Vol. 1, Geographic Area Series, Part 21), Suffolk County in which Boston is located has no livestock animals in the county inventory.