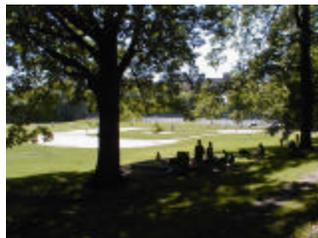


Town of Brookline

Sustainability Inventory

JULY 2002



Summary of Findings:
Recommendations for Moving Towards A Sustainable Brookline

To pursue the vision of greater community sustainability, local government must develop policies and promote practices that conserve natural resources over the long-term while enhancing economic vitality and social well-being. The findings of the Sustainability Inventory describe the high quality of life that Brookline residents enjoy. Overall excellent educational resources exist for students, the economy is strong, residents are healthy, feel safe, and they are actively involved in community activities. In addition, residents have access to clean water resources, pedestrian and bike friendly environments, and open space for passive recreation, athletic activities and resource protection.

Based on the 2001 Inventory, the Town can be commended for its:

- ◆ Commitment to climate change, energy efficiency, and clean air as evidenced by its development and implementation of a Local Climate Action Plan
- ◆ A strong residential recycling rate (37%)
- ◆ Collection of over 6,000 gallons of hazardous waste at Brookline's annual Household Hazardous Waste Collection Day
- ◆ Participation of 76% of registered Brookline voters in national elections
- ◆ Low unemployment rate of 1.5%
- ◆ Passage of a living wage for all municipal employees (\$10.30/hour)
- ◆ High teacher to student ratio of 1 teacher to 15.8 students
- ◆ Commitment by 84% of students to go to higher education
- ◆ Clean and sufficient supply of water
- ◆ Broad access to an exceptional public transit system as well as pedestrian and bike friendly environments
- ◆ 94% of households surveyed in 1998 census indicated a favorable response to current public safety

The findings of the Inventory also identify some areas that the Town of Brookline needs to address to maintain its high quality of life.

Findings that the Town should address:

- ◆ Ranked among the dirtiest 10% of all counties in the US in terms of air pollution (US EPA)
- ◆ Non-point source pollution is the greatest threat to surrounding water bodies
- ◆ 17% of registered voters participated in local and state elections
- ◆ Number of employment opportunities decreased by 7.6% between 1990-96
- ◆ 9.7% of Brookline's student population has limited English proficiency
- ◆ In a student poll, 10% of 9th grade students have reported to attempted suicide
- ◆ 40% of households pay more than 30% of their total income on housing
- ◆ Future inventory of affordable housing could decrease to 5% within the next 20 years
- ◆ 56% of total open space is unprotected

In terms of municipal action, the Town of Brookline can make great strides towards sustainability by establishing green building ordinances, increasing its procurement of environmentally friendly products, and promoting green business practices. It also needs to ensure that sufficient local job opportunities exist for residents, that funding is continued for the Health department's community programs, and that an adequate supply of affordable housing exists for residents. In addition, the Town needs to continue to work with regional entities to protect the watershed as well as to improve air quality. In regards to the community's contribution to a more sustainable Brookline, residents need to reduce vehicle miles traveled, non-point source pollution, and purchase more environmentally-friendly products. These goals could be met through a

comprehensive environmental education campaign aimed at Brookline residents. Given the high level of education, affluence and community activism, it should be feasible to engage Brookline residents in more sustainability practices.

Municipal recommendations for moving towards sustainability:

- ♦ Working towards the designation of a green building code that encourages the use of environmentally responsible materials and energy efficient design, siting of buildings near mass transit, and contracting of goods and services from local companies where feasible
- ♦ Enlisting the assistance of all departments in implementing the Local Climate Action Plan
- ♦ Conducting an inventory of the Town's natural resources to gain a better understanding of the biological resources present in the Town
- ♦ Reducing use of herbicide/pesticide/fertilizers
- ♦ Unprotected open space (653 acres unprotected to 506 acres protected) as protected open space.
- ♦ Development of increased procurement of environmentally responsible goods by all municipal departments
- ♦ Supporting the block purchasing of green energy with other area CCP cities
- ♦ Increasing use of renewable energy from 3% to 5% in the next five years
- ♦ Developing incentives to reduce impervious surfaces
- ♦ Procuring more hybrid vehicles and promoting their use among municipal employees
- ♦ Ensuring that private waste haulers, whom service 54% of residents, offer the option of recycling waste for residents
- ♦ Increasing the availability of affordable housing through inclusionary ordinances and the allocation of general funds
- ♦ Cooperating with regional authorities on watershed protection campaigns
- ♦ Initiating a storm water management by-law to control non-point source pollution
- ♦ Surveying local civic involvement to gain a better understanding of residential civic interests
- ♦ Using clean-burning, renewable fuels for energy sources, and consuming energy in an efficient manner
- ♦ Continue to work with state and local officials in the creation of a municipal franchise that would pool residents' and municipal buying power in order to make the purchase of energy generated from renewable resources possible

Community-wide recommendations for moving towards sustainability:

- ♦ Increasing educational opportunities for students to become familiar with wildlife and to assist in monitoring the health of local wildlife
- ♦ Initiate a green business program to get businesses to conduct pollution prevention audits, reduce VMT and to buy environmentally responsible goods
- ♦ Organize a comprehensive citizen education campaign that addresses reducing private use of the automobile, water conservation and non-point source pollution, buying from green businesses, and voter education. Educational materials could be made available at frequently visited public places
- ♦ Increasing the number of energy audits and energy efficiency systems that the Town performs to maximize energy efficiency in the commercial and residential sectors
- ♦ Pursuing improvements with the MBTA to encourage increased use of public transportation, such as the purchase of clean fuel buses, more frequent green line service with expanded capacity at peak hours, expanded bus routes, provision of bus transfers and bicycle racks on buses

By integrating the local economic system, natural resource base and citizen welfare equally into policy decisions, Brookline will continue to become a more sustainable community.

Introduction

Understanding the state of community resources and the causes of its degradation, helps to ensure that new policies do not further stress the system, but instead acknowledge resource limitations and work to maintain their integrity.

In order to complete Brookline's Sustainability Inventory, data from 15 distinct categories was collected and evaluated, priority actions were identified, sustainability targets were set and an action plan with recommendations was developed.

The Sustainability Inventory assesses the following environmental and socio-economic resources.

Environmental Resources

Water
Air
Land
Waste
Energy
Transportation
Biological Resources

Socio-Economic Resources

Health
Economy
Housing
Safety
Education
Recreation
Civic & Municipal Involvement

Each resource is analyzed under a pressure-state-response framework to highlight the impact of the community's utilization of a resource on its quality and viability. Questions within the pressures section look to identify those inputs that deplete or modify a resource. The state of a resource indicates the impact of current consumption rates. Finally, the response section assesses the effectiveness of management strategies implemented by local government.

Completing a Sustainability Inventory is a critical step along the path towards a sustainable Brookline that provides for a high quality of life for both present and future generations. It sets a factual profile, or baseline, of the community's resources from which targets are set to move the local government towards more economically, socially and environmentally sustainable practices.

Sustainability reflects holistic thinking and inclusive decision making. A sustainable Brookline will be able to meet the needs of the present generation without compromising the ability of future generations to meet their own needs.

AIR

PRESSURE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
What are the total annual emissions from stationary sources including: Criteria Air Pollutants (CO, PM-10, NOx, SO2, Pb, O3, VOC) Greenhouse gas emissions (CO2, CH4, N2O)?	This indicator assists with setting goals. The mapping of sources may reveal promixity of sources to sensitive receptors.	The Area and Point Sources for Norfolk County in 1996 were recorded as follows: CO= 4,106 tons; PM-10=10,872 tons; Nox= 3,202 tons; SO2= 8,107 tons; VOC's= 14,398 tons. In 1998, CO2 levels in Residential areas were recorded at 279,308 tons, Commercial at 186,045 tons, and Waste/Sewer at 8,806 tons. No data was available for CH4 and N2O.	Environmental Defense Scorecard for Norfolk County 1996 Emissions Summary of Criteria Air Pollutants from www.scorecard.org Brookline Emissions Inventory.
What are the total annual emissions from mobile sources including:Criteria Air Pollutants (CO, PM-10, NOx, SO2, Pb, O3, VOC) Greenhouse gas emissions (CO2, CH4, N2O)?	This indicator assists with setting goals. Mapping of sources may reveal proximity of sources to sensitive receptors.	Mobile Sources for Norfolk County in 1996 were recorded as follows: CO= 117,574 tons; PM-10= 8,316 tons; Nox= 18,370 tons; SO2= 711 tons; VOC= 12,322 tons. In 1998 the CO2 levels of personal vehicles was 121,000 tons, Commercial vehicles 14,600 tons, and Transit 5,000 tons. No data was available for CH4 and N2O emissions.	Environmental Defense Scorecard for Norfolk County 1996 Emissions Summary of Criteria Air Pollutants from www.scorecard.org Brookline Emissions Inventory.
STATE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
How many days did criteria air pollutants exceed healthy levels or how many "unhealthy" air days were declared by the state environmental agency?	This indicator is useful in order to assess the air quality. A high incidence of "unhealthy air days" suggests that Brookline needs to take more efficient measures to ensure its residents clean, healthy air.	In 1999 and 2000, the O3 levels were recorded as zero on Harrison Avenue, Boston. Likewise, in 1999 O3 levels at the Long Island Hospital in Boston, and Powder Horn Hill (Chelsea) registered as a "4" and "3" respectively.	U.S. Environmental Protection Agency New England, 2000 Ozone Exceedances from www.epa.gov/region1/eco/ozone/o3exceed-00.html Massachusetts Department of Environmental Protection's 1999 Massachusetts Air Quality Report.
How many neighborhoods are exposed to health risks from fine particulates >5% of the time?	The information on particulates would likewise indicate air quality issues.	There is no data available specific to Brookline. At the present time, no monitoring stations exist.	Personal Communication with Pat Mahoney, Brookline Department of Public Health.
What are the ten largest stationary sources of air pollutants and relevant compliance status?	This assists with setting reduction targets, allowing the community to pressure responsible parties to comply with regulations.	In 1996, the top ten facilities responsible for emissions of Criteria Air Pollutants in Norfolk County were: Braintree Electric; Bird, Inc.; Twin Rivers Technologies; Whidden Memorial Hospital; Plymouth Rubber Co.; MCI Norfolk; Raytheon Co; Wrentham State School; Polaroid Corporation; and GTE Govt System Corp.	www.scorecard.org
RESPONSE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
How many regulatory and voluntary programs have been established to improve air quality (e.g. Car/Van Pool programs or alternatively fueled vehicles procurement policies)?	The number and relevance of programs currently in place to improve air quality will allow a community to see its strengths or weaknesses.	Member of the Climate Change Protection Program, Mercury Thermometer Buyback Program.	International Council for Local Environmental Initiatives. Personal communication with Pat Mahoney, Brookline Department of Health.

BIOLOGICAL RESOURCES

PRESSURE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
What is the total acreage of non-developed land converted to development over a 10-year period. (See Land pressures category).	Habitat loss is the number one cause of species extinction. Therefore, it is useful to determine how much land is being lost to development in Brookline.	No information is readily available for Brookline in terms of non-developed land converted to developed.	Local Government Planning, GIS or Environmental Dept.
STATE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
What is the number of reported cases of health problems in plants and animals in urban area caused by environmental contamination?	Health problems indicate the presence of a disturbance, which threatens the sustainability of species. If health problems are recorded, useful measures to avert the problem can be put into action.	The Woolly Adelgid is currently threatening the Eastern Hemlocks, Dutch Elm, and Chestnut tree species.	Personal communication with Tom Brady (Brookline Conservation Administrator).
How many threatened and endangered species (flora and fauna) are within the municipality?	By recording threatened and endangered species, appropriate actions can be taken to minimize the loss of a particular species.	There is one endangered species located within the Boston portion of Olmsted Park, the 3-Spined Stickleback.	Town of Brookline Open Space Plan 2000.
What is the number of native vs. exotic species?	This number indicates levels of species invasion, and would reveal areas of concern in Brookline.	There is currently no available data for this indicator.	Personal communication with Tom Brady (Brookline Conservation Administrator).
What is the measurement of toxins in indicator species over time? E.g. Quantity of PCBs in bird shells.	The presence of toxins is a useful measure to assess the health of certain species.	There is currently no available data for this indicator.	Personal communication with Tom Brady (Brookline Conservation Administrator).
RESPONSE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
What is the total investment annually in open space and habitat conservation efforts (gross and per capita).	The total expenditures that are spent on conservation efforts by a town is useful to monitor progress.	In 1998 (FY) the budgeted expenditures for Conservation were \$79,506 including personnel, services, and supplies. Using town census data from 1998 (a population of 53,098) this would be approximately \$1.497 per capita.	Town Census, Town Clerk's Office; Fiscal Year (FY) 1999 Program Budget

ENERGY

PRESSURE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
<p>What is the energy capacity of Brookline?</p>	<p>As the demand for energy continues to increase, it is important for a town to be able to project whether the capacity of the local energy supply will be sufficient to meet the predicted energy demands in 10, 50, and 100 years.</p>	<p>Brookline is currently partnering with NSTAR, New England on the topic of energy capacity. At this time there are no quantifiable measures to ensure that energy demands will be met; the energy company believes the outlook looks good for the coming years.</p>	<p>Personal communication with Mike Durand, spokesman for NSTAR.</p>
STATE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
<p>What is the percentage of renewable energy (wind, solar, hydro, biomass) used within Brookline?</p>	<p>The percentage of renewable energy utilized by a community indicates the efforts to reduce energy consumption.</p>	<p>The Town of Brookline utilizes 3% of renewable energy.</p>	<p>Personal communication with Kara Chakiris- NStar.</p>
RESPONSE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
<p>How many residents and commercial businesses engage in energy efficiency projects initiated by a federal, state, or local authority? (e.g. Green lights and Energy Star)</p>	<p>This indicator reveals the current level of cooperation amongst the population to make energy efficient changes.</p>	<p>Between 1998 and 2000, NSTAR reports that as many as 2,368 Brookline residents received energy efficiency services.</p>	<p>Personal communication with Tina Torres, NSTAR Corporation, April 2001.</p>

LAND

PRESSURE	RELEVANCE OF INDICATORS	FINDINGS	DATA SOURCE
How much unprotected open space exists in Brookline?	Parcels of land that are unprotected in Brookline are particularly vulnerable to development pressures.	Since 1994, Brookline has lost 30 acres of open space to development.	Brookline Open Space Plan 2000.

STATE	RELEVANCE OF INDICATORS	FINDINGS	DATA SOURCE
How many acres of open and recreational space per person exist? Describe as a municipal average and on a neighborhood level.	This information is useful to ensure Brookline residents will continue to enjoy open and recreational space.	According to the Town Census, Brookline's population in 1998 was 53,089. In 1999, this number decreased to 48,724, and in 2000, jumped back to 54,718. The Federal Census lists 57,107. There is 1,159 acres of open and recreational space in Brookline. According to federal census population data there are 0.02 acres per person.	Census 2000, Brookline, MA, www.census.org
How many areas of protected open space exist vs. unprotected open space?	This number will indicate the level of protection on Brookline's open space, and reveal the number of acres that are vulnerable to development.	The number of acres of protected open space in Brookline is 506 (44% of total open space), leaving 653 acres of unprotected open space (56% of total open space).	Brookline Open Space Plan 2000.
What is the total land area occupied by city, broken down by land use type (residential, commercial, industrial, agricultural, transportation, institutional, open space, etc.)?	This indicator is useful in terms of planning, and demonstrates the variety of land uses in town.	Total acreage by land use type in Brookline is as follows: Residential: 2,086.686 acres; Commercial: 361.600 acres; Industrial: 2.577; Transportation (MBTA owned): 5.782; Agricultural: 70.747; Institutional: 293.532; Open Land: 843.998; and Vacant Parcels: 84.482.	Personal Communication with Kate Lommen, Town of Brookline GIS Department.

RESPONSE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
What zoning laws and/or land use policies that protect open space exist in Brookline, as well as zoning laws that allow mixed use development?	To protect open space a town must have zoning laws and/or land use policies in place that safeguard land from future development.	Land is considered protected in Brookline if it falls under a Conservation Restriction, Article 97, or is owned by a Conservation Land Trust.	Brookline Open Space Plan 2000.

TRANSPORTATION

PRESSURE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
What is the average vehicle miles traveled (VMT) per capita?	By obtaining the average vehicle miles traveled per capita, an estimate of the energy consumption can be made, as well as the frequency of automotive travel by citizens.	From 1998 to 1999, the average VMT per capita was 15 miles.	Personal communication with Kara Chakiris-Nstar.
What is the average commute time of community residents for work trips?	This indicates the average daily commute for residents, which is useful in terms of how many people work outside of Brookline, and if so, how much energy is required to commute to work.	The 1998-1999 average commute time of community residents for work trips was recorded as 29 minutes.	Personal communication with Vijay Mahal-CTPS
What is the average miles per gallon of private automobiles?	This information will rate the average fuel efficiency of cars in Brookline.	The average miles per gallon of passenger cars is 21.4; Passenger cars and other 2-axle, 4 tire vehicles is 19.6. According to the Registry of Motor Vehicles, there are no records for automobiles registered in Brookline in terms of vehicle type (i.e. SUV, etc.). For the year 2000, the following automobiles were registered in Brookline: Passenger cars- 27,573; Light trucks (under 10,000 pounds)- 5,533; Heavy trucks- 137; Motorcycles- 336; Other- 171.	Personal communication with Laurann Paragona- Registry of Motor Vehicles.
What is the number of work trips by a) public transit, b) car/van pool, c) bicycle, d) or on foot?	This information is useful in assessing the current forms of transportation used by commuting residents.	According to a 1990 report, 8,256 people out of 30,663 workers in Brookline took some form of public transit to work. 16,624 people chose to commute to work by car or van.	Census Study 1990: www.census.gov, Local and Regional Transportation Agencies
STATE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
What percent of population lives/works within a 10-15 minute walk of a transit stop? Or commercial street? (Only do for residential neighborhoods.)	An evaluation of resident's access to transit is important when trying to become a sustainable community in terms of transportation.	The percentage of the population that lives and works within a 10-15 minute walk (3/4 of a mile) of a transit stop or commercial street is 77.6% in 1990 and 78.5% in 2000. This takes into consideration a buffer zone around the Beacon Street and Commonwealth Avenue areas. The "D-Line" is not considered in this estimation.	Paul Reim, CTPS
What is the percent of streets that are pedestrian & bicycle friendly (have sidewalks, street furniture, pull-out curbs or bike lanes?)	This will indicate the strength/weaknesses in the accessibility of alternative transportation corridors.	Approximately 90% of Brookline streets have sidewalks and are suitable for pedestrian traffic. There is no current measure of the bicycle lane access in Brookline.	Personal communication with Charles Barry (Brookline Department of Engineering, Brookline Town Hall).
RESPONSE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
What is the annual expenditure to build, maintain, and support road infrastructure vs. funds allocated to transit and non/low polluting forms of transportation (e.g. walk and bike)?	This indicator will evaluate budget allocation for transportation related costs.	According to 2001 statistics, \$1,539,000 was spent to build and support road infrastructure in Brookline, and \$150,000 was paid for sidewalk and bridge repairs. \$5,251.271 was paid to the MBTA for fiscal year 2001.	Sean Cronin, Selectman's Office

Sustainability Inventory Results

TRANSPORTATION
(continued)

<p>How many alternative fueling stations (CNG, electric, etc.) are there in Brookline?</p>	<p>As part of a goal to increase the use of alternatively fueled vehicles.</p>	<p>Currently, there are no alternative fueling stations in Brookline. The nearest one is located in West Roxbury. Plans are in the works to establish a natural gas filling station at the highway garage.</p>	<p>Personal communication with Charles Barry (Department of Engineering, Brookline Town Hall).</p>
<p>What is the proportion of total commuters participating in voluntary ride-share or other government sponsored commuter programs to reduce use of private automobile?</p>	<p>This will indicate the level of community participants committed to reducing emissions from the private automobile.</p>	<p>Of Brookline's population, 8% participate in voluntary ride-share programs.</p>	<p>Personal communication, Donna Smallwood, Caravan, April 2001.</p>
<p>How adequate are Brookline's land use/zoning regulations at reducing distances traveled between residential and commercial areas?</p>	<p>Reducing the distances traveled between residential and commercial areas will further promote accessibility and encourage alternative transportation methods.</p>	<p>3,459 commuters walk to work (11.2%), and 534 (1.7%) bike to work.</p>	<p>Personal communication with Charles Barry (Department of Engineering, Brookline Town Hall).</p>

WASTE

PRESSURE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
What percentage of waste is landfilled or incinerated? State whether it is local or distant disposal.	This indicator is useful in determining resources allocated for waste removal (i.e fuel for transporting the waste, etc.) as well as total waste accumulation.	The amount of waste sent to Maine for incineration in Fiscal Year 2000 totaled 13,026.24 tons. For Fiscal Year 2001, this figure decreased to 12,779 tons.	Town of Brookline DPW.
What limitations does Brookline have in terms of solid waste?	Limitations are useful in assessing the effectiveness of a town's solid waste program.	Brookline has limited control over the private haulers that service apartments and other residences for which the town does not provide waste hauling. There are currently no requirements of these private haulers to provide recycling services.	Town of Brookline DPW.
STATE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
What is the amount of total waste generated per resident?	This information is useful in terms of each resident's role in generating solid waste in Brookline. A high average will indicate the need for solid waste reduction programs.	This data is not available for Brookline.	Local Private Waste Collector or Public Works of Local Government
What is the amount of hazardous waste generated by the community?	A large amount of hazardous waste will indicate a need to reduce consumption and generation of these materials. At the same time, waste gathered at the Household Hazardous Waste Collections is also a positive indicator, because this was all waste averted from regular trash collection.	Approximately 6,030 gallons of hazardous waste was collected at the annual Brookline Household Hazardous Waste Collection Day in May 2001.	Clean Harbors, Contractor.
Where are hazardous waste sites, transfer stations, landfills and incinerators sited in Brookline?	It is useful to inventory the presence of these sites and their location(s) in relation to demographics, etc.	Brookline does not have any hazardous waste sites at this time. The Transfer Station is located on Newton Street, Brookline, as well as the former landfill. Brookline ships its waste to Maine for incineration.	Personal communication with Peter Sellers (Brookline Highway Department).
What is the per capita recycling rate for residents and commercial buildings?	This rate is useful in determining the success of the recycling program in Brookline.	The recycling rate for 2000 was 35%, 1999- 39%, and 1998- 38%. It is important to note that this data is residents only.	Massachusetts Department of Environmental Protection Recycling Rate Information.

Sustainability Inventory Results

WASTE (continued)

RESPONSE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
How many facilities are available to residents to recycle hazardous materials, buy re-used good, etc?	The availability of recycling locations for residents indicates Brookline's commitment to reducing solid waste.	Brookline residents participate in Hazardous Waste Collection once a year at the Transfer Station on Newton Street.	1998 Municipal Recycling Data Sheet for Brookline; Personal communication with Alyssa Cook (Recycling Coordinator, Brookline Department of Public Works).
List voluntary and mandatory programs that encourage recycling of waste (include total amount of waste reduction resulting). Record level of involvement or compliance.	This is useful in assessing the overall outreach in terms of municipal offerings for recycling.	The Town of Brookline offers Curbside Recycling for residents on the municipal trash system, and compost bins are made available to residents for a reduced cost through the Department of Public Works. The town hosts an annual Household Hazardous Waste Collection Day; Collection of Yard Waste; Paint Collection Program; strict enforcement of solid waste by-laws which included requiring all residents serviced by municipal trash collection to recycle. 35% of total materials collected by the town in 2000 was recycled. To date, over 600 composting bins have been purchased by residents.	Personal communication with Alyssa Cook (Recycling Coordinator, Brookline Department of Public Works). 2001-2002 Town of Brookline Solid Waste and Recycling Guidelines.
How many Superfund (National Priority List) sites exist vs. will be cleaned up in the next year?	Superfund sites are costly cleanups and indicate poor environmental health.	Currently there are no Superfund sites within Brookline.	U.S. Environmental Protection Agency's Comprehensive Environmental Recovery, Compensation, and Liability System (CERCLIS).

WATER

PRESSURE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
How many gallons are consumed per year (gross and per capita) in Brookline?	The gallons consumed per year is useful in order to measure the consumption versus supply. By averaging a per capita consumption rate, it is useful to gain a sense of individual consumption, and assess the sustainability of that use.	In 1998, Brookline consumed 1,950 million gallons of water. This equals an average of 36,730.77 gal/person/year, and 100.7 gal/capita/day. In 2000, consumption dropped to 1,884 million gallons in Brookline, averaged at 34,400 gal/person/year, and 94.2 gal/capita/day.	Records from the Brookline Water/Sewer Dept., Personal communication with Andy Pappastergion (Water/Sewer Dept.), Town census- Brookline Town Clerk.
a) from ground water versus surface water sources	The source of water withdrawal is important for many reasons. (I.e. whether or not there is a backup method for water sources).	1998-2000 100% was obtained from surface water sources (Quabbin Reservoir).	Brookline Draft Plan 2000-2010- Draft Water Quality Management Section.
b) Percentage from local versus distant sources (%)	This is relevant when determining how accessible water resources are for Brookline.	From 1998-2000, 100% of surface waters was withdrawn from distant sources (Quabbin Reservoir).	Brookline Draft Plan 2000-2010- Draft Water Quality Management Section.
c) by residential, industrial, agricultural and commercial use.	In order to set goals for water consumption reduction, it is vital to know what each sector presently consumes.	In 2000, the total gallons consumed by each of the following sectors (in millions) were: Residential-1,618; Commercial-122; Agricultural-98; and Municipal-47.	Records from the Brookline Water/Sewer Dept., Personal communication with Andy Pappastergion (Brookline Water/Sewer Dept.).
Ratio of renewable water supply to withdrawals (for ground or surface water); Percentage of local water source withdrawals that is consumed by users outside the jurisdiction?	This information projects water supply versus demand, and avoids depleting them beyond healthy recharge rates.	MWRA (supplies the Greater Boston Area) withdraws an average of 270 mill/gal/day from the Quabbin Reservoir. Safe yield is 350 mill/gal/day.	Personal communication with Andy Pappastergion (Brookline Water/Sewer Dept.).
How many gallons of discharged polluted water has filtered into local water bodies?	The aggregate quantity of polluted water that a community discharges is an indicator of its impact on receiving waters.	In 1998, 4.457 billion gallons was discharged to MWRA. This is equivalent to an average daily flow of 12.21 million gallons. In 1999, 3,792 million gallons of polluted water was discharged to the MWRA. The average daily flow being 10.39 million gallons.	Brookline Annual Reports (1998, 1999).
List the largest sources of polluted discharges in Brookline.	Useful when determining pollution reduction goals.	Stormwater is the main threat to local water bodies. There are no CSO's in the Town of Brookline.	Personal communication with Andy Pappastergion (Brookline Water/Sewer Dept.).

Sustainability Inventory Results

WATER (continued)

STATE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
What is the EPA's Index of Watershed Indicators rating for ambient surface water quality in urban area?	This is useful in determining Brookline's rating in relation to other communities in the country	Between 1998-2000 the EPA rated the Brookline Watershed as a "6." This indicates "more serious problems-High vulnerability."	EPA Index of Watershed Indicators, Environmental Protection Agency, www.epa.gov.
What is the number of violations of the public drinking water quality standard?	This information keeps health standards in check for the town, and points out areas of concern for remediation in terms of compliance.	Between 1998 and 2000, one violation was recorded for failure to properly educate about lead and copper. Compliance for this violation was achieved in February 2000.	EPA's Envirofacts - Water: http://www.epa.gov/enviro/index_java.html ; EPA's report on Drinking Water Quality: http://es.epa.gov/oeca/main/fedgov/compliance/pws98.pdf ; and EPA's Safe Drinking Water Information System: http://www.epa.gov/ogwdu/dwinfo.htm
What is the number of violations at local Water and Wastewater Treatment Facilities?	It is important to keep the occurrence of violations in check, and ultimately reduce the occurrence of these violations.	At the Deer Island facility, there were 41 qualified violations in 1998. In 2000, this number increased to 112, 110 of them qualified violations.	Personal communication, David Duest, MWRA Program Manager of Process Monitoring, March 2001.
What is the swimmability and fishability of municipal water bodies, measured in days/year?	If Brookline were to adequately test and record this information, the community would be better informed of the levels of water quality for recreational uses.	At present, Brookline does not measure this information.	Personal communication with Tom Brady, Conservation Administrator.
Is there adequate capacity of the municipality's waste water treatment facility based on forecasted population growth?	In terms of long tem planning, the capacity level of the waste water treatment facility should be closely monitored to ensure sustainability with pressures from population growth.	The capacity is perceived to be adequate (See section on Water Quality).	Personal communication with Kenneth Chin- MWRA Program Management Division.
RESPONSE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
List regulations that protect sensitive hydrological features, e.g. wetlands, floodplains, and estuaries within the community. What is the current level of enforcement of those regulations?	It is important for Brookline to determine if it has adequate protection for its water resources through federal, state, and local regulations.	The MA Wetlands Protection Act enforces stringent regulations, with the exception of the exemption of public utilities. Brookline is also protected by the MA Rivers Protection Act.	Personal communication with Tom Brady, Conservation Administrator.
List voluntary and mandatory water conservation programs that the non-governmental sector participates in; Note compliance and involvement in those programs	In order to reduce the impact of a community's wastewater on receiving waters, it is important to initiate programs to address water consumption and/or effluent reduction.	Between 1998 and 2000, no voluntary or mandatory conservation programs were in place.	Personal communication with Andy Pappastergion (Brookline Water/Sewer Dept.).

Sustainability Inventory Results

WATER (continued)

<p>List voluntary and mandatory waste water emissions reduction programs; Note compliance and involvement in those programs (including total amount of emissions reductions resulting).</p>	<p>These programs ensure that reduction efforts are currently in place, and the community is working towards sustainability measures.</p>	<p>In 1995, Brookline entered a Consent Agreement with the EPA to improve stormwater quality (still ongoing). A Capital Improvements Program has also been initiated but there are no local programs addressing consumption issues.</p>	<p>Brookline Draft Plan 2000-2010-Draft Water Quality Management Section.</p>
<p>List watershed protection programs that the local government has in place.</p>	<p>This demonstrates the actions currently in place by the Town of Brookline. If certain water quality indicators turn up a trend in a particular subject area, (i.e. stormwater drains) new programs could be implemented to dissuade further decline to that resource area.</p>	<p>The watershed protection programs in place for 1998-2000 include the federal Clean Water Act and NPDES Permit Program. At the state level, the MA Wetlands Protection Act, MA Rivers Protection Act, MA Stormwater Discharge Management Policy/Permit Program. Locally, Brookline has the Capital Improvements Program, Rules and Regulations Regarding the Use of Common Sanitary Sewers for the Town of Brookline, Regulations for the Construction of Sanitary Sewer and Surface Water Drain Connections, money towards wetland protection and restoration, the Emerald Necklace Environmental Improvements Master Plan, and Conservation education.</p>	<p>Brookline Draft Plan 2000-2010-Draft Water Quality Management Section.</p>

CIVIC AND MUNICIPAL INVOLVEMENT

STATE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
<p>What is the voter participation rate for Brookline's registered residents?</p>	<p>This is an excellent indicator of resident involvement in local politics and concern for the welfare of the community.</p>	<p>In the 1996 national election, 75.8% of registered voters in Brookline voted. In the 1998 November town election, 19% of registered voters participated.</p>	<p>Town Clerk, Town of Brookline.</p>
RESPONSE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
<p>What is the total number of town meetings held in Brookline?</p>	<p>This number reflects the relationship between the local government and its citizens.</p>	<p>According to town records, in 1998 Brookline held 595 public meetings addressing a variety of issues within the community.</p>	<p>Town Clerk, Town of Brookline.</p>
<p>How is the local business community involved with its residents?</p>	<p>The involvement of local businesses with the community creates a strong partnership and sense of pride throughout Brookline.</p>	<p>In a survey completed by the Brookline Economic Department in 1999 local businesses cumulatively donated over \$500,000.00, with a median donation of \$910.00. The response rate to this survey was low, and as a result, this dollar figure could be dramatically underestimated.</p>	<p>Kobayashi, Yoko, Report of the Survey on Business Owner's Contribution to the Town of Brookline, Town of Brookline Department of Planning and Economic Development, December 2000.</p>

ECONOMY

PRESSURE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
What is Brookline's unemployment rate?	This indicator can reveal a need for increased economic development or for more effective training programs for its work force.	In 1998, there were 473 unemployed persons in Brookline, corresponding to a 1.5% unemployment rate. In 1999, there were 456 unemployed, at a rate of 1.4%. The state unemployment rates for these years were 3.3% and 3.2%, respectively.	Massachusetts Department of Employment and Training, Employment and Wages in Brookline, www.detma.org, February 2001.
What is the unemployment breakdown in Brookline by ethnicity?	This will determine whether particular ethnic groups suffer from unusually high unemployment rates, thus requiring special attention.	The following is the unemployment breakdown in Brookline by ethnic group: White-1,378 unemployed, 4.72% unemployed within racial group; Black- 61 unemployed, 6.05% within racial group; American Indian/Eskimo- 0, 0% within racial group; Asian/Pacific Islander- 69 unemployed, 3.28% within racial group; and "Other"- 58 unemployed, 20.20% within this group.	1990 National Census, www.census.gov
How many people rely on public assistance?	This is an important indicator of economic independence within a community.	In 1996, 2,887 Brookline residents received public assistance through Medicaid. By comparison, of the fifteen other communities in Massachusetts of similar size, only one, (Arlington) has fewer Medicaid recipients [3].	MassCHIP v2.6 r 217.0, MA Dept. of Public Health, Copyright 1995-2001, February 2001.
Does Brookline have adequate local employment opportunities?	It is important to reduce commute times and vehicle emissions to ensure a sustainable community.	Between 1997 and 1999, the labor force in Brookline grew 0.129%. Data on the growth/decline of job opportunities within the community could only be obtained for the years between 1990 and 1996. According to this data, employment within Brookline declined by 7.76% during this time period. This data suggests that the labor force may be slowly increasing, while the number of local job opportunities is decreasing.	Massachusetts Department of Employment and Training, Employment and Wages in Brookline, www.detma.org, February 2001.
STATE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
Does Brookline have a "Living wage?"	This indicator ensures that employees are receiving a wage that will cover their minimum living expenses.	A warrant article was passed at the November 13th 2001 Town Meeting for the creation of a Living Wage By-Law, effective July 1, 2002. In summary, the article states "the town shall pay each of its employees no less than \$10.30 an hour except as provided in SECTION 4.8.5 and in collective bargaining agreements with the town under G.L. c. 150E, section 7."	Town of Brookline, "Town Meeting Article Results," www.townofbrooklinemass.com, November 2001.
How is economic equity in Brookline?	The distribution of income within a community provides important demographic information that can help to gauge economic equity.	The results of surveys from 1989 and 1998 show a fairly uniform income distribution in Brookline. More than half of the household population in Brookline made over \$50,000 in 1989 and 1998.	Healthy Brookline Vol. III, 1999 Brookline Health Department; 1990 National Census, www.census.gov, March 2001.
What is the rate of office vacancies in Brookline?	This information indicates the real estate values in the local area, and how prospective buyers value the community.	This information is not currently updated for the town.	Brookline Assessor's Office.

Sustainability Inventory Results

ECONOMY (continued)

RESPONSE	RELEVANCE OF INDICATOR	FINDINGS	
What is the lender confidence level in town?	This indicates the levels of confidence that lenders have in the economic development of the area.	There are currently 12 lenders actively making loans in Brookline, indicating a high level of confidence in property value.	Massachusetts Strategic Envirotechnology Partnership: UMASS/Executive Office of Environmental Affairs, http://www.stepsite.org , April 2001.
Does Brookline engage in Green Business Assistance Programs?	Green Business ensures the success of cleaner technologies, and encourages responsible consumer behavior.	Brookline currently has no financial or other assistance programs to offer green businesses that may be considering relocating to Brookline. The MA Department of Environmental Protection does have a voluntary program, "STEP."	Personal communication, Jenny Braun-Friedman, EOE, March 2001.

EDUCATION

PRESSURE	RELEVANCE OF INDICATORS	FINDINGS	DATA SOURCE
What is the fluctuation of student enrollment in Brookline?	This information is useful when determining the annual demand on school resources.	Between school years 1994-1995 and 1997-1998, Brookline district public schools saw an increase in enrollment from 5905 to 5922. This corresponds to a modest increase of 0.29%.	Massachusetts Department of Education, School and District Profiles Brookline District, www.profiles.doe.mass.edu, February 2001.
STATE	RELEVANCE OF INDICATORS	FINDINGS	DATA SOURCE
What is the Student-To-Teacher ratio in Brookline?	This ratio is an excellent indicator of the level of commitment a community has to its students.	In 1998, there was 1 teacher for every 15.8 students in the classroom.	Massachusetts Department of Education, School and District Profiles Brookline District, www.profiles.doe.mass.edu, February 2001.
What is the High School Dropout Rate?	Student drop-out rates are useful in assessing the social and economic situations of adolescents, as well as the overall quality of the school system.	The Brookline public school system had exceptionally low dropout rates of 0.4% in 1994-1995 and 0.1% in 1997-1998.	Massachusetts Department of Education, School and District Profiles Brookline District, www.profiles.doe.mass.edu, February 2001.
What percentage of students pursue higher education upon graduation?	Student interest in higher education can be used to forecast future economic quality of life of a community's youth as well as provide information on local perceptions of the importance of a college education.	According to 1999 statistics, 83.4% of high school seniors within the District plan on attending a Four Year College, 4.4% plan on enrolling at a Two Year College, and 7.2% enter the workforce.	Massachusetts Department of Education, School and District Profiles Brookline District, www.profiles.doe.mass.edu, February 2001.
RESPONSE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
What are the per-pupil expenditures in Brookline public schools?	This gauges Brookline's investment in students over time.	In school year 1997-1998, per pupil expenditures were \$7,957.00 for all day programs.	Massachusetts Department of Education, School and District Profiles Brookline District, www.profiles.doe.mass.edu, February 2001.
How many Environmental Education programs does Brookline offer?	This assists in measuring local interest in environmental awareness and stewardship.	The following education programs have been in place since 1998: Community environmental education art project, "Visions of a Green Community;" Conservation Commission sponsored initiative-Stormwater pollution education; "Mutt Mitt" program to encourage picking up after animals; ongoing art, education, and music programs sponsored by such groups as the Friends of Hall's Pond, Friends of the Muddy River, and the Brookline Greenspace Alliance.	Brookline Annual Report 1998 and 1999, Town of Brookline: Town of Brookline: Planning Department, Water Quality Management section of Draft Comprehensive Plan 2000-2010.
Is environmental curriculum in place at Brookline public schools?	This information indicates local interest in environmental issues.	100% of Brookline public schools present environmental education to their students.	Personal communication, Christopher Whitbeck, K-8 Curriculum Coordinator, Brookline Department of Education; Personal communication, Victor Mellahof, 9-12 Curriculum Coordinator, Brookline Department of Education.

HEALTH

PRESSURE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
What are the most prevalent causes of mortality in adults and children in Brookline?	By determining the top causes of mortality, a town can provide more for the community in terms of prevention, education, and early detection.	Variants of heart disease are the most common cause of mortality in adults living in Brookline. In 1998, major cardiovascular disease, heart disease, and coronary heart disease were the top three in adults. In children, there does not seem to be a common mortal threat.	MassCHIP V. 2.6 r 217.0, MA Department of Public Health, Copyright 1995-2001, February 2, 2001.
STATE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
What are the asthma levels in Brookline?	The frequency in asthma cases can help pinpoint areas within a community that may be under environmental stress from poor air quality.	In 1998 there were 41 hospital discharges for asthma corresponding to 0.077% of the population.	MassCHIP V. 2.6 r 217.0, MA Department of Public Health, Copyright 1995-2001, February 2, 2001.
Are there high lead levels in children?	This information helps to assess whether or not a community or specific area within a community is under environmental stress from high lead levels.	Brookline does not appear to have a serious problem with high lead levels. In 1998, only one child had blood lead levels greater than 25ug/dL. Likewise, there was only one level reported in 1999.	MassCHIP V. 2.6 r 217.0, MA Department of Public Health, Copyright 1995-2001, February 2, 2001.
What is the percentage of babies born with low birth weight?	High percentages of children born with low birth weights can indicate the presence of environmental contaminants or identify a need for more prenatal care.	In 1999, there were 6.9% of children born under a healthy birth weight (infants weighing less than or equal to 5.5 pounds).	MassCHIP V. 2.6 r 217.0, MA Department of Public Health, Copyright 1995-2001, February 2, 2001.
What is the number of teenage pregnancies in Brookline?	The number of teenage pregnancies and births within a community can indicate stresses on the social system and/or a need for an increased focus on contraceptive education or distribution.	In 1998 there were 12 births by adolescents aged 10-19. In 1999, the number was listed N/A denoting a number less than 6 [1]. This was considerably less than the national average according to the CDC which was, in 1998, 1 births per 1000 teenagers aged 10-14 and 51.1 per 1000 for teenagers aged 15-19. The number of pregnancies in teenagers aged 10-19 in Brookline in 1998 was 13.	MassCHIP V. 2.6 r 217.0, MA Department of Public Health, Copyright 1995-2001, February 2, 2001.
What are the cancer risks in Brookline?	By determining cancer risks, residents and health departments in town can take the necessary steps towards prescreening for these cancers.	The cancer registry lists the top three types of cancer in adults in 1997 as breast cancer (in females), prostate cancer, and colo-rectal cancer and does not yet provide data for 1998. Cancer hospitalization records from 1998 list the top three types of cancer in adults as colo-rectal cancer, breast cancer (in females), and lung cancer	MassCHIP V. 2.6 r 217.0, MA Department of Public Health, Copyright 1995-2001, February 2, 2001.
What is the number of attempted suicides in Brookline?	This information is helpful to determine the state of mental health within a community.	In the Brookline Public School Department, 10% of 9th grade students reported attempting suicide.	Healthy Brookline Vol. IV: Youth Risk Behavior Survey, Brookline Department of Public Health, 2000.
RESPONSE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
How many community health programs does Brookline offer?	The number and diversity of preventative and educational health programs within the community measure the town's commitment to educating the public about important health issues.	There are a vast number of health programs that Brookline offers to the community, some of which include: Bicycle Safety Education Program; Depression Screening Day, Yoga Classes; Sponsored Events for Students Against Drunk Driving (SADD); AIDS Peer Leadership Program; Eating Disorders Program; Hepatitis B Immunization.	Town of Brookline Annual Report, 1998, 1999, and 2000.

HOUSING

PRESSURE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
How many residents are seeking federally assisted living?	This indicator will be useful to judge whether Brookline supports and promotes social and economic diversity.	There are currently 452 families on the waiting list for federal aid with the Brookline Housing Authority.	Personal communication with Thelma Williams, Applications Manager, Brookline Housing Authority, April 2001.
STATE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
What is the average house price to median income?	This indicator serves to indicate to what degree home ownership is affordable for its citizens currently dwelling in Brookline.	Condominiums are the most affordable form of home ownership in Brookline. Between 1998-1999 the average price of condominiums increased 16%, from \$210,000 to \$243,000. In response, the income requirement has increased from \$75,000 to \$112,000.	Brookline Housing Advisory Board, "Update on Affordable Housing," Town of Brookline, May 2000.
What is the average monthly rent versus the median monthly salary?	This indicates the affordability of rental housing.	The average monthly rent for a 2 bedroom apartment ranges from \$1600 to \$2800. This sets the combined household income for individuals seeking rentals at \$64,000 to \$112,000 (This range applies the standard ratio of 30% of income budgeted for housing costs).	Brookline Housing Advisory Board, "Update on Affordable Housing," Town of Brookline, May 2000.
What is the ratio of homeowners to renters in Brookline?	This indicator provides a measure of transience within the community.	By 1990, the percentage of renters was 43%, homeowners fell to 57%, a proportion that appears to be remaining constant. According to Census 2000, there is a total of 26,413 household units in Brookline. 11,583 of these units are occupied by owners, 14,011 renters, and the remaining 819 are vacant.	Town of Brookline: Planning Department, Open and Recreational Space section Draft of Comprehensive Plan 2000-2010: Census 2000 (www.census.org).
What percentage of materials are renewable in construction activities in Brookline?	The use of renewable resources is essential to ecological sustainability.	At present, this figure is less than 1%.	Solar Design Associates, www.sda.com, April 2001.
How many affordable housing units are available to Brookline residents?	This indicator ensures that all housing does not get priced out of reach.	Housing units in 1990 totaled 25,219; 7.7% of these units were categorized as "affordable."	Brookline Housing Advisory Board, "Update on Affordable Housing," Town of Brookline, May 2000.
RESPONSE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
What is the Town of Brookline currently doing to assess housing issues?	This is useful to see what is being done currently in the town, and areas that need to be addressed.	In 1999 the Housing Advisory Board proposed a set of guidelines for developers of rental and condominium housing subject to Section 4.40 of the Zoning By-law "inclusionary zoning," which the Planning Board adopted in December of 1999.	Brookline Housing Advisory Board, "Update on Affordable Housing," Town of Brookline, April 2001.

MUNICIPAL ACTIVITIES

PRESSURE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
What are the budget restraints for Brookline, in terms of the town government's involvement in sustainability efforts?	The most significant pressure on increasing green practices within municipal activities is budgetary constraints. The more money, the more resources can be obtained such as time and personnel.	There are four full-time staff members involved with environmental management in Brookline (Parks and Open Space Director, Conservation Administrator, Conservation Assistant, and Planning Director).	Department of Public Works, Brookline.
STATE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
How many staff members are involved in environmental management in Brookline?	An increased number of staff working on environmental management ensures sustainability measures are being taken.	There are four full-time staff members involved with environmental management in Brookline.	Department of Public Works, Brookline.
What outside sources are incorporated into environmental management?	This indicates that the town's ability to utilize outside resources which help build strong partnerships between other municipalities, organizations, etc.	Brookline maintains a strong partnership with area universities, for research assistance in areas such as climate change and sustainability.	Communication with Erin Chute, Director of Parks and Open Space, Brookline DPW.
Does Brookline have programs that involve the elderly population?	Brookline's population contains a significant number of elderly residents. It is important that these individuals be given the opportunities for municipal activities.	In May of 2001 the Brookline Senior Center was opened, which provides daily activities for senior citizens.	"Brookline Open Space Plan 2000."
Does Brookline have an Environmental or Sustainability Mission Statement?	This statement indicates that goals are being set to effectively manage the environmental and social resources for Brookline residents.	The mission statement is "To preserve and protect the town's environment through administration of mandated federal, state, and town laws and regulations."	"Brookline Open Space Plan 2000."
RESPONSE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
How much does Brookline spend on "environmentally friendly" goods?	By purchasing environmentally friendly goods, Brookline demonstrates an increased concern for the natural environment.	In 1998, Brookline spent approximately \$70,000-\$80,000 on "environmentally friendly" goods. The primary goods purchased, include: recycled paper goods, recycled toner cartridges (for printers), recycled books, and energy efficient light fixtures.	Personal communication with David Geanakakis, Chief Procurement Officer, Town of Brookline.

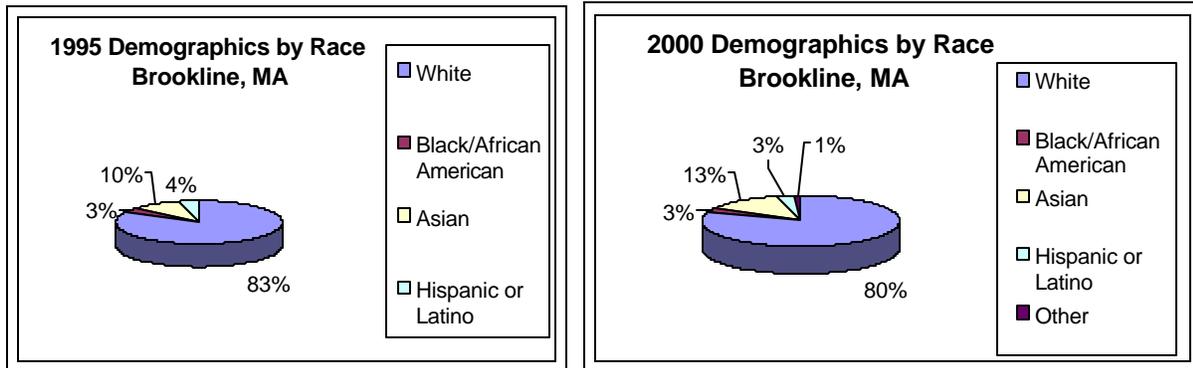
SAFETY

PRESSURE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
What percent of the Brookline community feels safe?	Community confidence in, and comfort with public safety officials promotes healthy neighborhood interaction, which may serve to benefit local businesses, and improve overall community health.	According to 1998 statistics, 94.87% of the population feels safe in the Town of Brookline.	Brookline Annual Report 1998, Town of Brookline.
STATE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
What is the total number of recorded crimes in Brookline?	This number will allow Brookline the opportunity to monitor the occurrence of criminal activities and make relevant changes to address the issues that are prevalent.	In 1998, the approximate number of crimes for the year were as follows: 220 assaults, 253 burglaries, 1,098 larceny/thefts, 114 motor vehicle theft/attempts, and 31 robberies.	"Brookline Annual Report 1998," Town of Brookline and the Brookline Police Department website: www.brooklinepolice.com .
How many domestic violence arrests occurred in Brookline?	By monitoring the number of domestic violence cases in Brookline, the overall health of the community will become more sustainable.	There were 114 domestic violence arrests in 1998, 115 in 1999, and 70 in the year 2000.	Brookline Police Department website: www.brooklinepolice.com
RESPONSE	RELEVANCE OF INDICATOR	FINDINGS	DATA SOURCE
How many public safety and crime prevention programs exist in Brookline?	These town sponsored programs are an excellent means to educate the public because they promote active citizen involvement.	In 1998, Brookline supported nine community organizations: D.A.R.E. (Student Drug Prevention Program); Brookline Evening Surveillance Team; School Bus Safety Initiative; Rape Aggression Defense classes; Operation Conehead (encourages the use of bike helmets); Neighborhood Crime Watch; Diversionary Program; Walk & Talk Program; and the Alert Program.	"Brookline Annual Report 1998," Town of Brookline.
What is the number of policemen per community member?	A high number of public safety personnel measures the effective use of police department resources and ensures the community a strong commitment to public safety.	For Fiscal Year 1997, there were 321.39 public safety officials (police and fire) per every person in Brookline.	"Brookline Annual Report 1998, Town of Brookline.

Brookline Demographics

Brookline, situated in Norfolk County, is bordered on three sides by the City of Boston, and on the southwest by the City of Newton. Brookline encompasses an area of 6.8 square miles and is easily accessible from major highways and transportation corridors.

Demographics by race



*Note: The U.S. Census allowed respondents to declare more than one race with which they identify, therefore the specific numbers for each race total a number which is greater than the actual 2000 population of Brookline. Additionally, 71 people identified themselves as Native American or Alaskan Native and 16 people identified themselves as Hawaiian and other Pacific Islander. Both of these races registered as less than 1% of the total Brookline population.

Male/Female Ratio

According to Census 2000, 25,832 out of 57,107 (Brookline's total population) are male (45.2%) and 31,275 are female (54.8%) [1].

Demographics of town employees

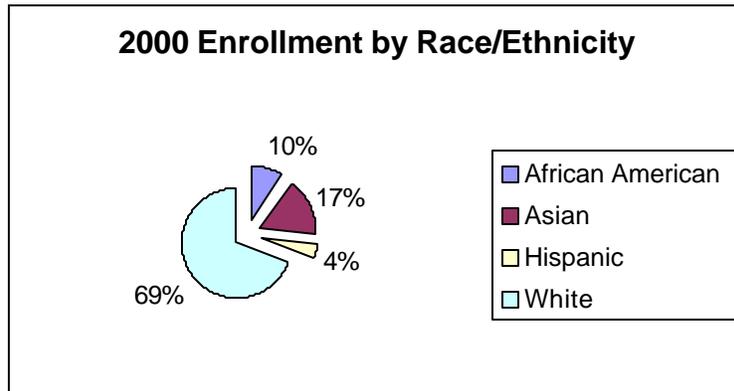
The following chart illustrates current employment information obtained from the Information Technology Department in the Town of Brookline.

Age	White	Black	Hispanic	Asian	Indian	Other	Total
15-30 yrs.	230	22	12	21	1	34	320
31-40 yrs.	166	9	3	6	0	7	191
41-50 yrs.	219	9	3	7	0	4	242
51-60 yrs.	233	9	3	4	1	6	256
≥ 61	5	82	0	0	1	2	90

(Source: Information Technology, Town of Brookline, July 2001 [2]).

Demographics of Brookline students

There were a total of 5,989 students enrolled in the Brookline Public School Department in the year 2000. Of this total, 3,020 were males (50.4%) and 2,969 females (49.6%). The following is the race/ethnicity breakdown of these students:



(Source: Massachusetts Department of Education, <http://www.profiles.doe.mass.edu/home.asp>, November 2001)

SOURCES

1. U.S. Census 2000, <http://www.census.gov>
2. Communication with Debra Gildart, Information Services, Town of Brookline.

ENVIRONMENTAL RESOURCES



“Sustainable development is positive socioeconomic change that does not undermine the ecological social systems upon which communities and society are dependent.”

Dr. William E. Rees, University of British Columbia.

AIR QUALITY



Why examine AIR QUALITY?

Air quality directly impacts human and environmental health as well as the social connectivity of a community. Human and environmental health is adversely affected by air pollution, smog, and increased ground-level ozone. Impacts on human health include diseases such as asthma and lung cancer. Because of elevated health risks in areas with poor air quality, residents are less likely to spend time out of the home and therefore, have fewer opportunities to interact with neighbors and peers in the community.

Climate change is another issue related to air quality and community sustainability. The ability of gases that make up the earth’s atmosphere to trap the sun’s heat has long been recognized as a “natural greenhouse effect” that makes the earth habitable. However, there has been a significant increase in atmospheric gases associated with climate change primarily due to burning of fossil fuels for energy and transportation. Scientists believe that the effects of climate change could cause dramatic changes in the earth’s climate and produce extreme weather patterns that threaten the infrastructure upon which cities depend.

A sustainable community must control emissions of criteria air pollutants, air toxics, and greenhouse gases. The U.S. EPA uses six “criteria air pollutants” as indicators of air quality. For each of these criteria air pollutants, a maximum concentration has been established, above which adverse effects to human health may occur. Air toxics, as defined by the U.S. EPA, “are those pollutants that cause or may cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental and ecological effects.” Examples of air toxics include benzene (found in gasoline), mercury, dioxins, and asbestos. Greenhouse gases can be found naturally in the atmosphere, while others directly result from anthropogenic activities.

Findings of Sustainability Inventory

**Note: Criteria Pollutant data is not available specific to Brookline (County information is listed below)*

Summary of Data Points	Revealing Facts
What are the total annual emissions from stationary and mobile sources including: Criteria Air Pollutants (Carbon Monoxide (CO), PM-10, Nitrogen Oxides (NO _x), Sulfur Dioxide (SO ₂), Lead (Pb), Ozone (O ₃), and Volatile Organic Compounds (VOC’s))?	In Norfolk County, the total annual emissions from point sources are 3,515 tons, area sources are 37,710 tons, and the total emissions from mobile sources are 157, 293 tons (For breakdown of pollutants, see table on page 7).
What are the top ten largest stationary sources of air pollution in Norfolk County?	According to a 1996 study, the top ten largest stationary sources of air pollution in Norfolk County are: Braintree Electric; Bird, Inc; Twin Rivers Technologies; Whidden Memorial Hospital; Plymouth Rubber Co.; MCI Norfolk; Raytheon Co.; Wrentham State School; Polaroid Corporation; and GTE Govt System Corp.
How many days did criteria air pollutants exceed healthy levels, as determined by the	Unhealthy levels of ozone occurred on 4 occasions in Boston in 1999.

(Findings, Continued)

USEPA?	
How does Brookline rate in terms of air quality on a national level?	Norfolk County rates among the dirtiest/worst of 10% of all counties in the U.S.
What are the total Greenhouse Gas Emissions in Brookline? (Carbon Dioxide (CO ₂), Methane (CH ₄), and Nitrogen Oxides (N ₂ O))	In 1998, 474,159 tons of CO ₂ were emitted.
What programs have been established to improve air quality within Brookline?	Brookline has joined the Cities for Climate Protection Program (CCP) sponsored by the International Council for Local Environmental Initiatives (ICLEI), introduced energy efficiency programs, as well as commenced a program to collect old mercury thermometers and replace them with digital thermometers.

Recommendations

- ◆ Monitor Air Quality on a local level
- ◆ Reduce Greenhouse Gas Emissions
- ◆ Serve as a role model, and encourage neighboring towns and cities to join the CCP program

Making the Sustainability Connection Through Inter-Departmental Partnerships

Consider monitoring local air quality

Public Works Department, Health Department

Encourage alternative forms of transportation

Transportation Division, Highway Division, Economic Development, Planning & Community Development



PRESSURE: STRESSORS ON A RESOURCE

Sources of pollution

Monitoring the levels of criteria air pollutants in the community assists in evaluating the quality of the air and establishing programs and goals to attain acceptable levels for human and environmental health requirements. Identifying pollutants of concern and their sources is important because the areas of highest concentrations may be located near sensitive receptors such as kindergartens and nursing homes.

Criteria air pollutants

Environmental Defense (ED), a National Non-Profit Organization, tracks five criteria air pollutants consisting of carbon monoxide (CO), nitrogen oxides (NO_x), particulate matter of 10 microns (PM-10), sulfur dioxide (SO₂), and volatile organic compounds (VOCs). Sources of pollution are placed into one of three categories: mobile sources, area sources, and point sources. It is important to distinguish between

mobile and stationary (area and point source) pollutant sources in order to identify potential human and environmental receptors and appropriate control technologies.

Both onroad vehicles, such as cars, trucks, and buses, and offroad vehicles, such as ships and airplanes, are included in the ED definition for **mobile sources** of air pollution. Mobile sources are significant contributors to the levels of pollutants in the air and are responsible for approximately 75% of the CO emissions every year in the United States.

ED defines **area sources** as stationary sources that emit less than 10 tons of a particular criteria air pollutant per year or which emit less than 25 tons of a combination of pollutants per year. Area sources are typically small sources of pollution, such as dry cleaners and gas stations. Particulate matter and VOCs are the primary pollutants produced by these sources.

Point sources have the same definition as area sources, but consist of major industrial facilities, such as power plants and oil refineries. Various point sources contribute approximately 90% of all national sulfur dioxide emissions each year [2].



STATE: QUALITY OF A RESOURCE

Air quality ranking

In relation to other counties in the United States, Norfolk County ranked among the highest 10% in terms of the number of people living in areas where cancer risk from hazardous air pollutants exceeds 1 in 10,000. According to Environmental Defense, 645,145 people within the county face a cancer risk from air pollutants; more than 100 times the goal set by the Clean Air Act [2].

Total annual emissions

An effective way to evaluate how Norfolk County fares with criteria air pollutant emissions is to compare it to another county. Suffolk County has been chosen as a means for comparison due to its close proximity to Brookline. Below are the 1996 Emissions Summary of Criteria Air Pollutants taken from <http://www.scorecard.org>. All numbers are expressed in tons of pollutant emitted that year.

Norfolk County

	<u>Carbon monoxide</u>	<u>Nitrogen oxides</u>	<u>PM-10</u>	<u>Sulfur dioxide</u>	<u>Volatile organic compounds</u>
<u>Mobile Sources</u>	<u>117,574</u>	<u>18,370</u>	<u>8,316</u>	<u>711</u>	<u>12,322</u>
<u>Area Sources</u>	<u>3,946</u>	<u>2,828</u>	<u>10,697</u>	<u>6,532</u>	<u>13,707</u>
<u>Point Sources</u>	<u>160</u>	<u>374</u>	<u>175</u>	<u>1,575</u>	<u>1,231</u>
All sources	121,680	21,572	19,188	8,818	27,260

Suffolk County

	<u>Carbon monoxide</u>	<u>Nitrogen oxides</u>	<u>PM-10</u>	<u>Sulfur dioxide</u>	<u>Volatile organic compounds</u>
<u>Mobile Sources</u>	<u>132,077</u>	<u>19,614</u>	<u>5,831</u>	<u>808</u>	<u>11,738</u>
<u>Area Sources</u>	<u>6,869</u>	<u>3,072</u>	<u>9,990</u>	<u>5,832</u>	<u>5,030</u>
<u>Point Sources</u>	<u>1,777</u>	<u>5,678</u>	<u>135</u>	<u>1,855</u>	<u>1,838</u>
All sources	140,723	28,364	15,956	8,495	18,606

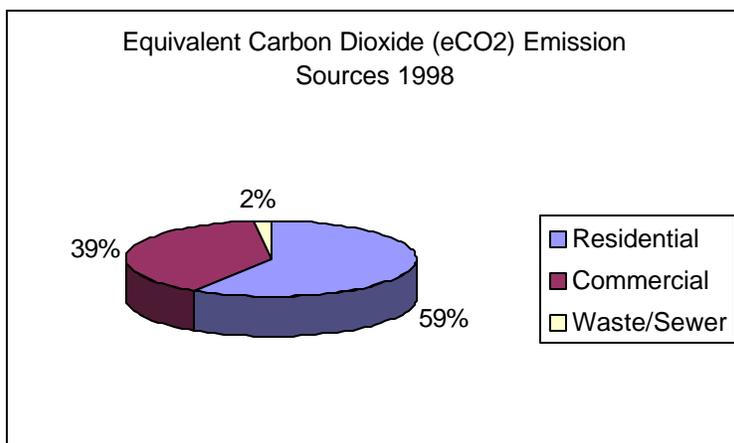
Source: <http://www.scorecard.org>

Based on the table above, each county has different pollutants of concern. Norfolk County fares better than Suffolk with CO, NO_x, and SO₂, but is significantly higher in its annual tonnage of PM-10 and VOCs emitted. In both counties, the most pollution comes from mobile sources, which suggests that a priority should be to encourage alternative forms of transportation.

The Massachusetts Department of Environmental Protection tracks emissions of criteria air pollutants at air monitoring stations located at various locations throughout Massachusetts. Although there are no air monitoring stations in Brookline, there are a few throughout Boston and surrounding areas. The closest station to Brookline is located on Harrison Avenue in Boston (Roxbury). This station began sampling air in December of 1998 and monitors for several parameters including ozone and particulate matter of 2.5 microns (PM-2.5). The primary pollutants of concern in this report are PM-2.5, PM-10, ozone (O₃), CO, nitrogen oxide (NO₂), SO₂, and lead (Pb). The pollutants are measured in either micrograms per cubic meter (ug/cu meter) or parts per million (ppm). The data from the various air monitoring stations throughout Boston indicate O₃ and NO₂ as exceeding national standards in 1998 [1].

In 2000, Brookline completed a Greenhouse Gas Emissions Inventory that identified sources of CO₂ and methane. The emissions data for carbon dioxide for Brookline indicates that in 1998, 474,159 tons of CO₂ were emitted. The breakdown of the sources of these emissions is as follows: Residential 279,308 tons; Commercial 186,045 tons; Waste/Sewer 8,806 tons. The 1998 Brookline Emissions Inventory determined the four largest sources of carbon dioxide emissions to be commercial electricity use, personal vehicles, residential electricity use, and the burning of residential heating oil [3].

Sources of eCO2 Emissions 1998



Source: Town of Brookline Greenhouse Gas Inventory and Report, 2000

Top 10 sources of stationary air pollutants

According to 1996 air quality data, the top ten facilities responsible for stationary air pollutants in Norfolk County include:

Rank	Facility	Tons of pollutants
1.	Braintree Electric, Braintree MA	96
2.	Bird, Inc.	28
3.	Twin Rivers Technologies, Quincy, MA	10
4.	Whidden Memorial Hospital, Everett, MA	7.9
5.	Plymouth Rubber Co., Canton, MA	4.2
6.	MCI Norfolk, MA	3.8
7.	Raytheon Co.	3.3
8.	Wrentham State School, Wrentham, MA	3.0
9.	Polaroid Corporation, Cambridge, MA	1.9
10.	GTE Govt. System Corp.	0.91

(Source: <http://www.scorecard.org>)



RESPONSE: ACTIONS THE TOWN OF BROOKLINE IS TAKING

Current programs

As air quality problems do not adhere to geographic borders, it is very difficult for a single municipality to have complete control on local air quality. This is primarily the responsibility of the broader reaching state and federal environmental agencies although local governments need to contribute to air quality improvements as well. Brookline has a few programs in place to compliment the state and federal programs. One such program includes monitoring and tracking the frequency and occurrence of days when unhealthy ozone or pollutant levels are detected. The ozone season spans April 1st to September 30th. In 1999, ozone national standard levels were exceeded on four days in Boston. Brookline alerts its residents of unhealthy ozone days.

Brookline has joined the Cities for Climate Protection program (CCP) sponsored by the International Council for Local Environmental Initiatives (ICLEI). CCP is a voluntary program that provides assistance in evaluating and implementing effective measures to reduce municipal greenhouse gas emissions, specifically CO₂. Brookline has conducted an inventory of the greenhouse gases emitted by municipal and community sources. The Town is addressing air quality issues in various aspects of municipal governing. For example, to reduce emissions from town buildings and facilities, comprehensive energy efficient retrofits have been conducted on lighting fixtures, heating and cooling systems, and windows [3]. Many efforts to reduce greenhouse gas emissions also serve to reduce criteria air pollutants through municipal programs that promote alternative forms of transportation and decrease traffic congestion.

Additionally, the Brookline Department of Public Health, Parks and Open Space Division, and the Department of Public Works have initiated a program to collect old mercury thermometers and replace them with digital ones. This buyback program will prevent the illegal disposal of mercury and the potential for the element to become airborne and create hazardous air quality [4].

RECOMMENDATIONS

Initiate localized testing methods

County and statewide data for air pollutants can provide a general indication of air quality within the larger area, but no data exists that is specific to Brookline. Although regional data is reliable, each town has unique characteristics and sources of pollutants that may create a slight variance in the air quality data. Therefore, Brookline should consider monitoring air on a local level. Air quality does not necessarily need to be monitored on a daily basis. Less frequent monitoring can be beneficial by ensuring Brookline is in compliance with the Clean Air Act, as well as continuing to alert residents on days air quality has reached unhealthy levels. Initially Brookline would monitor for all criteria air pollutants, including PM-2.5, PM-10, O₃, CO, NO_x, SO₂, Pb, and VOCs. Once trends have been established, Brookline can place more of a focus on key pollutants that are most detrimental to the local air quality.

Because air-monitoring equipment can be expensive, a program could be established with a university in the area to assist with both the financial and personnel obligations. Brookline should consider utilizing Town Hall for a local air monitoring station due to its location. If a full air monitoring station is not feasible, Brookline could consider a local program that consists of using a specialized bucket designed to take air

samples. Various groups, referred to as the Bucket Brigade, have conducted such sampling throughout California and South Africa. For more information on this program, refer to www.igc.org/saepej. This type of air monitoring should be conducted quarterly or at a minimum yearly.

Strive to reduce Greenhouse Gas emissions

The town is in the process of designing strategies to reduce its greenhouse gas emissions. By joining the CCP campaign the town is demonstrating its commitment to reduce municipal greenhouse gas emissions. Brookline has already completed three of the campaign's necessary goals, conducting an emissions inventory, setting a reduction target, and completion of a Local Action Plan to reduce emissions. Although the inventory is complete, Brookline should continue to monitor its greenhouse gas emissions. An up-to-date inventory is a powerful tool that will help the town to create effective policies to address greenhouse gas emissions. Policies that require increased energy efficiency at both the municipal and community level and strong campaigns that educate the community on actions they can take to reduce greenhouse gas emissions. The town should continue to support climate protection efforts and the implementation of the Local Action Plan through financial and personnel needs.

Set an example for neighboring communities

Additionally, Brookline should encourage neighboring cities and towns to join the CCP campaign. Due to the fact that air is a contiguous resource, effective improvement of its quality requires a regional strategy and coordination to reduce emissions of criteria air pollutants and greenhouse gases. Encouraging and supporting other municipalities to reduce their emissions allows Brookline's efforts to have a more significant impact on overall air quality.

Recommend changes in policy

Refer to the Transportation section of this report to review further policy recommendations that will impact air quality in Brookline.

SOURCES

1. Massachusetts Department of Environmental Protection, et al., "Commonwealth of Massachusetts, 1999 Air Quality Report."
2. Environmental Scorecard, Environmental Defense, from <http://www.scorecard.org>
3. Evans, Tom, "Greenhouse Gas Inventory and Forecast Report", Town of Brookline, August 2000.
4. Personal Communication: Pat Maloney, Brookline Department of Public Health. April 2001.

BIOLOGICAL RESOURCES



Why examine BIOLOGICAL RESOURCES?

Maintaining biological resources serves economic, environmental and recreational purposes. Although Brookline is a relatively urban area, the Open Space Plan 2000 indicates that it maintains a high level of species diversity. The plan states that 209 bird species have been identified within the town limits as well as a number of mammals such as squirrels, opossum, chipmunks, and white-tailed deer. Red-backed salamanders and various frog and toad species have been noted in the Hoar Sanctuary and some turtle species have been seen in both Hall's Pond and Leverett Pond. Additionally there are several fish and many insect species thriving in Brookline [1]. The presence of such flora and fauna provide aesthetic pleasure, serves to protect precious air and water resources, and can act as indicators of environmental contamination levels.

Findings of Sustainability Inventory

Summary of Data Points	Revealing Facts
What is the major documented threat to native flora?	The Hemlock Woolly Adelgid insect pest is presently destroying Brookline's Eastern Hemlock trees. Other previously existing threats to New England flora include Dutch Elm Disease.
What is the number of threatened or endangered species in Brookline?	In 1999, there were zero to report; In 2001, 1 species was added to the threatened or endangered list in Brookline, a fish identified as the Threespine Stickleback.
How many non-native tree species have been removed?	In 1998, 74 non-native tree species were removed.
How much does the town invest in open space and habitat conservation?	According to 1998 statistics, \$79,506 was invested in open space and habitat conservation.

Recommendations

- ◆ Develop methods to regularly assess and improve upon wildlife habitat
- ◆ Ensure that current wildlife habitat is permanently protected
- ◆ Conduct a Biological Inventory of the community in conjunction with the state's sponsored programs

Making the Sustainability Connection Through Inter-Departmental Partnerships

Increase educational opportunities of native flora and fauna through public school, university, and volunteer research

School Department, Parks and Open Space Division, Information Technology

Promote planting of native species
in community

Parks and Open Space Division,
School Department, Highway Division,
Building Department, Planning &
Community Development



PRESSURE: STRESSORS ON A RESOURCE

Open space converted to developed land

Habitat loss is the leading cause of species extinction. A community that does not restrict the amount of land that is converted from open or green space to developed land will significantly reduce species habitat and diversity within its borders. The quantity of land annually converted from undeveloped to developed land is one way to monitor this threat to wildlife populations. Brookline is currently developing the means to measure land development using GIS. Brookline's Greenways and open space resources not only increase aesthetics and provide opportunities for recreation, but also promote species diversity and maintain wildlife habitat as well.



STATE: QUALITY OF A RESOURCE

Severity of health problems in plants and animals

It is difficult to accurately determine the extent of the human impacts on Brookline's wildlife community. A major documented threat to native flora is the Hemlock Woolly Adelgid, which is a parasitic insect accidentally introduced from Asia. The town has taken control measures to reduce the spread of the insect, but many trees have failed. It will remain important for Brookline to replace lost trees with native species.

Number of threatened or endangered species in Brookline

The 2000 Open Space Plan listed no endangered species in Brookline in 1999. However, the Natural Heritage database currently lists one endangered animal within the town limits, the Threespine Stickleback which was observed at the inlet to Willow Pond in 2000 [1,2].

Presence of exotic species

Although there is no specific measure indicating the extent of exotic species in Brookline species such as Multiflora Rose, Buckthorn, Garlic, Mustard, and Norway Maples are prevalent in Brookline. The only available information indicated that at least 74 hazardous, non-native street tree species were removed in 1998 [3]. The town has demonstrated its commitment to the management of invasive species with the upland restoration at Hall's Pond required the removal of over one acre of invasive trees and shrubs. The invasive plant material was replaced with over 1,600 native plants. Brookline is concerned about invasive species within the community and intends to, where feasible and appropriate, plant species native to the area, such as Red Maple and Linden trees.



RESPONSE: ACTIONS THE TOWN OF BROOKLINE IS TAKING

Investment in open space and habitat conservation efforts

In fiscal year 1998, the town budgeted \$79,506 for operational Conservation expenditures. An additional \$1,150,782 of expenditures was budgeted for Public Grounds. These expenditures cover personnel, services, supplies, and capital improvements (Public Grounds only) [4]. In addition, Brookline conducted wildlife habitat inventories for the D. Blakely Hoar Sanctuary and the Emerald Necklace, restored a boardwalk at D. Blakely Hoar Sanctuary, is restoring the Hall's Pond Sanctuary, and plans to coordinate with the state Executive Office of Environmental Affairs to participate in its Biodiversity Days Program.

RECOMMENDATIONS

The Town of Brookline has invested time and resources in protecting open space and wildlife habitat. The town has created a thorough Open Space Plan that outlines measures to increase the quality of life through curbing further development of non-developed land. In addition to open space protection, the town should seek to acquire new open space. Brookline should continue to follow through with the goals set forth in the Open Space Plan 2000 and ensure that these measures are considered by all municipal departments as well as members of the community.

Develop methods to regularly assess and improve upon wildlife habitat

There are many important biological resource indicators for which data is not currently maintained at the local, state, or federal levels. For instance, the town may want to consider monitoring the percent of native versus exotic species within the community. It is well documented that the introduction of exotic species to a community often causes native populations of competing species to decline. This, in turn, impacts the flora and fauna dependent on the declining species. Therefore, it is important to monitor and prevent the introduction and spread of additional exotic species to reduce the impact on native populations.

Data is also not currently collected on populations of indicator species within Brookline. An indicator species is a "species of plant or animal...whose occurrence serves as evidence that certain environmental conditions exist" [5]. Additionally, visible changes occur in many indicator species in response to some type of environmental contaminant, which can serve to alert public officials to environmental quality degradation. Brookline should perform a taxonomic field study of indicator species located within the town. Once the study is complete, the Town can determine how to manage, monitor, and protect these species.

Ensure that current wildlife habitat is permanently protected

A final recommendation in relation to biological resources is to create permanently protected, natural open spaces. The town currently has 506 acres of protected open space, and 653 acres of open space unprotected. It is crucial that Brookline strive to protect this land to ensure the health and sustainability of Brookline's biota. The town should allow at least a small portion of public lands to be left as nature sanctuaries to provide the maximum habitat protection and ensure the most protection of native species.

SOURCES

1. Town of Brookline Conservation Commission, "Open Space 2000, Analysis and Plan for Brookline Conservation, Parks, and Recreation," February 2000.
2. Spina, Paul (Signal Corporation), U.S. Environmental Protection Agency; Dept. of Fish and Wildlife, Natural Heritage Database, March 2001.
3. Personal Communication: Tom Brady, Conservation Commissioner, Town of Brookline, February 2001.
4. Fiscal Year 1998 Program Budget, Department of Public Works, Town of Brookline.
5. Webster's New World Dictionary, Fourth edition, Webster's New World, 2001.

ENERGY



Why examine ENERGY?

Using clean-burning, renewable fuels for energy sources, and consuming energy in an efficient manner sets the foundation for a sustainable community. Municipalities need to lead the way by purchasing renewable energy (hydro, wind, solar), and installing energy-efficient devices (e.g. Light Emitting Diode illumination (LEDs) or compact fluorescents) in their facilities. Not only does energy conservation reduce greenhouse gas emissions and local air pollution, but it also saves money. By providing incentives for citizens and businesses to practice energy conservation and use some form of renewable energy, a community will be sending the right economic signal to make progress towards sustainability.

Findings of Sustainability Inventory

Summary of Data Points	Revealing Facts
Is the capacity of Brookline’s local energy supply sufficient to meet predicted energy demand? In 10, 50, and 100 years?	According to NSTAR, it is committed to working with Brookline to ensure that new generating capacity is available to meet growing demands. However, the town experienced numerous unplanned blackouts in 2001.
What is the percentage of renewable energy sources (wind, solar, hydro, biomass) used, relative to the total energy consumed in Brookline?	According to information from NSTAR, the Town uses 3% renewable energy.
How many residents and commercial businesses participate in energy efficiency projects initiated by a federal, state, or local authority?	NSTAR reports that between 1998 and 2000 2,368 Brookline residents received energy efficiency services.

Recommendations

- ◆
- ◆ Implement initiatives from the Brookline Climate Action Plan
- ◆ Participate in programs such as the Million Solar Roofs Initiative
- ◆ Increase community outreach and education (including residents and businesses alike)
- ◆ Support the block purchasing of Green Energy

Making the Sustainability Connection Through Interdepartmental Partnerships

Energy efficiency compliance

Transportation Division, Purchasing Department

Educate the community and set an example

Economic Development, Transportation Division, Parks & Open Space Division, Conservation



PRESSURE: STRESSORS ON A RESOURCE

What is the energy capacity?

As the demand for energy continues to increase, it is important for a town to be able to know from reliable projections whether the capacity of its energy supply is sufficient to meet predicted energy demand in 10, 50, and 100 years. Similarly, it is important to be informed of the steps a town's energy provider is taking to ensure that future energy needs can and will be met. According to Mike Durand, a spokesman for NSTAR, New England has and will continue to have new generating capacity available to meet growing demand [1]. ISO New England, the utility company that controls Brookline's supply of electricity, asserts that the outlook appears good for the coming years. Further confidence is derived from the fact that Massachusetts's legislation allows for the possibility of spikes in the cost of the electricity that distribution companies such as NSTAR buy from generating companies. Thus the state's distribution companies are not at risk of bankruptcy resulting from accruing costs, which they cannot recover [1].



STATE: QUALITY OF A RESOURCE

Utilization of renewable resources

To address the issue of global climate change it is vital that communities lessen their reliance on fossil fuels and increase their use of alternative energy. Towards this end it is advisable for Brookline to determine the current percent of renewable energy used by its citizens and businesses, and to promote the use of alternative energy. The percent of renewable energy currently used in Brookline is 3% [1].

Energy efficiency programs

Federal, state, and local authorities are increasingly acting to promote participation by citizens and businesses in energy efficiency programs. Energy Star appliances are designed to lower the demand on natural resources by using less energy. Individuals that choose to build a home incorporating the Energy Star Homes Program use 70% or less of the energy required for heating, cooling, and hot water than a home built to the national Model Energy Code (MEC). This saves the homeowner up to 30% and more on heating and cooling costs [6]. NSTAR reports that between 1998 and 2000 as many as 2,368 Brookline residents received services targeted to improve energy efficiency [2]. By tracking this data the town is able to identify participants and set goals for greater citizen involvement.



RESPONSE: ACTIONS THE TOWN OF BROOKLINE IS TAKING

Creation of an Action Plan

The Town of Brookline has developed a Climate Protection Action Plan in order to guide the community-wide effort to reduce greenhouse gas emissions. A goal to reduce annual emissions to 20% below the 1995

levels by the year 2010 has been established. Existing and potential reduction measures are described in the Plan [3].

Citizen Involvement

The Parks & Open Space Division and the Conservation Commission supported the founding of a new citizen environmental group: Climate Change Action Brookline (CCAB). This group sponsored three warrant articles in November 2000 to reduce greenhouse gas emissions contributing to climate change. The first requires the town to purchase two highly efficient hybrid gasoline/electric motor vehicles in FY 2002 with the intent of promoting the purchase of more energy efficient vehicles in the town's fleet. The second establishes a Moderator's Committee to investigate the creation of a municipal electricity franchise that would pool residents' and municipal buying power in order to make the purchase of energy generated from renewable resources possible. The third creates a moderator's committee to consider a bylaw that would require replacement of significant trees, which are cut down on public or private property [5].

Energy Efficiency Programs

Brookline should be applauded for rising to the enormous challenge that lies ahead. The Town has already begun to improve lighting efficiency within the high school and Town Hall. In both of these buildings older fluorescent lights are being replaced with newer ballasts and tubes. Occupancy sensors have been installed to save on lighting areas that are only sporadically visited. Brookline has made an admirable start. It should follow through on the initiatives it has already begun.

RECOMMENDATIONS

Investigate all proposed initiatives from the Climate Action Plan

It is strongly recommended that all proposed initiatives recommended in the Climate Protection Action Plan be investigated if not fully implemented.

Participate in the Million Solar Roofs Initiative (MSR)

The Town of Brookline should participate in the Million Solar Roofs Initiative led by the United States Department of Energy [4]. Launched during the Clinton Administration The Million Solar Roofs Initiative (MSR) is enabling businesses and communities to install solar energy systems on one million rooftops across the United States by 2010. The Department of Energy is leading this exciting initiative by working with partners in the building industry, local governments, state agencies, the solar industry, electric service providers, and non-governmental organizations to remove barriers and strengthen the demand for solar technologies.

Form partnerships for energy efficiency

The U.S. Department of Energy (DOE) will award 20-50 grants totaling \$1,500,000 to existing and/or new state and local partnerships. The grants are intended to support the partnerships' development and implementation activities and will be limited to \$50,000 each. The grants will be distributed among the six DOE regions, and applicants will be competing only with other applicants in their respective regions for funding. Boston and Newton have been among those chosen to receive grants [4].

The Energy Star Homes Program has a number of sponsoring utility companies that residents can team up with in an effort to build energy efficient homes. National Grid, NSTAR Electric, Keyspan, Western

Massachusetts Electric, GasNetworks, and Unitil are among the participating companies in New England [6].

Acquire renewable sources of energy

Brookline only utilizes 3% of renewable energy and should lobby for alternatives such as wind, hydro, and solar energy. These alternatives help reduce air pollution, and will assist Brookline in meeting the targets outlined in its Climate Action Plan. Given the number of Cities for Climate Protection participants in the Greater Brookline area, partnering with other municipalities to secure a lower energy price for these alternatives would be beneficial and cost effective.

Encourage community involvement

Community outreach is a tremendously important way to promote energy conservation. One way to raise both awareness and interest in the cause is to establish contests to see what family or business can cut its energy consumption the most in a given month. Winners could be celebrated in the local paper or on a sign posted in the town's center and awarded an attractive prize.

SOURCES

1. Personal communication: Mike Durand, NSTAR Corporation, April 2001
2. Personal communication: Tina Torres, NSTAR Corporation, April 2001
3. Evans, Tom "Greenhouse Gas Inventory and Forecast Report." Town of Brookline, August 2000.
4. U.S. Department of Energy, Million Solar Roofs Initiative, <http://www.doe.gov/>, April 2001
5. Town of Brookline's Conservation Commission <http://www.town.brookline.ma.us/Conservation/CurrentProjects.html#climatechangeactionbrookline>.
6. Energy Star Homes, http://www.energystarhomes.com/link/sponsoring_utilities.html, November 2001.

LAND



Why examine LAND?

To move towards sustainability, a community needs pollutant-free land for economic, environmental, and recreational purposes. Land needs to be devoid of toxins so that children can safely play. Sufficient land should be left as open space to provide a place for persons of all ages to positively and actively recreate. Lastly, wildlife needs a place to live as well. By wisely managing our lands, we can better meet our needs in a sustainable fashion.

Findings of Sustainability Inventory

Summary of Data Points	Revealing Facts
How many acres of open and recreational space per person exist?	There is an estimated 0.0203 acres of open and recreational space per person (See Chart 1A).
What is the total land area occupied by the town, broken down by land use type (residential, commercial, industrial, agricultural, transportation, institutional, open space, etc.)	See Table 1A.
What zoning laws and/or land use policies exist that protect open space? Are there zoning laws in place that allow mixed-use development?	Land is considered protected if it is under a Conservation Restriction, Article 97, or is owned by a Land Trust. Brookline is currently updating the Zoning By-Law, and has also listed specific goals for the protection of remaining open space in the Open Space Plan 2000.

Recommendations

- ◆ Create new Zoning Bylaws
- ◆ Develop incentives to reduce impervious surfaces
- ◆ Incorporate new landscape requirements
- ◆ Protect currently unprotected Open Space parcels

Making the Sustainability Connection Through Interdepartmental Partnerships

Reduce the total amount of impervious surface	Planning & Community Development, Housing, Department of Public Works
Prioritize open space to be protected	Conservation, Planning & Community Development, Parks & Open Space Division, Board of Selectmen



PRESSURE: STRESSORS ON A RESOURCE

Unprotected open space

Parcels of land that are privately owned and unprotected in Brookline are vulnerable to the intense development pressures that exist in this part of the state. Allendale Farm, the last remaining working farm in Boston-Brookline, is one particular example. Since 1994, only 9 acres have been added to protected status [3].



STATE: QUALITY OF A RESOURCE

Land area

The Town of Brookline is situated in Norfolk County and is surrounded on three sides by Boston, and on the Southwest by the City of Newton. Brookline has a total of 6.79 square miles of land, broken down into six different planning areas:

Population Density By Planning Area- 1990

Planning Area	Density (#/Acre)
Longwood/Cottage Farm	23
North Brookline	38
Middle Beacon	33
Brookline Village	30
Fisher Hill/Middle Brookline	7
South Brookline	4

(Source: Brookline Open Space Plan, 2000).

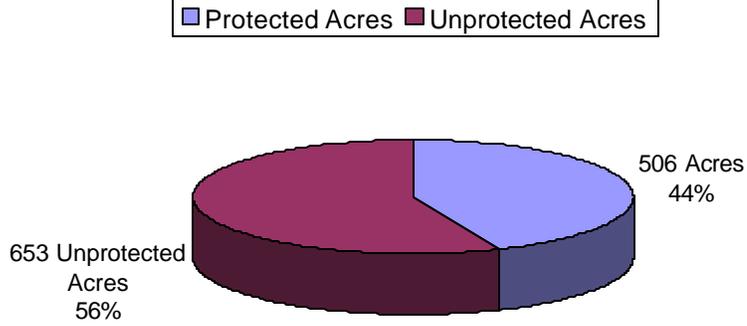
Open and recreational space per person

According to the 2000 Town Census (57,107 inhabitants), Brookline has 0.0203 acres per person of open and recreational space.

Percentage of unprotected open space

In order to ensure that Brookline's residents continue to enjoy open and recreational space it is necessary to monitor the number of acres of protected versus unprotected acres of land, and to pin point areas that are vulnerable to development. Land is considered protected if it falls under a conservation restriction, Article 97, or is owned by a conservation land trust. Of the total 1,159 acres of open space in Brookline:

Chart 1A: Breakdown of Open Space in Brookline



Source: Open Space 2000, Town of Brookline Conservation Commission

Table 1A. Total Acreage by Land Use Type

Use	Acres
Residential	2,086.7
Commercial	361.6
Industrial	2.6
Transportation (MBTA owned)	5.8
Agricultural	70.1
Institutional	293.5
Open Land	844
Vacant Parcels	84.5



RESPONSE: ACTIONS THE TOWN OF BROOKLINE IS TAKING

Existence of zoning laws

To protect open space a town must have zoning laws and/or land use policies that safeguard land from future development. As noted above land is considered protected if it falls under a conservation restriction, Article 97, or is owned by a conservation land trust such as the Brookline Land Trust. Land not protected under these mechanisms is at risk of being developed. 56% of Brookline's open space is unprotected.

Zoning by-laws

The Town of Brookline is currently preparing a significant update to the Zoning By-Law, the first such update since the last conducted back in 1962 [5]. In making these updates, the Town has availed itself an opportunity to promote conservation initiatives. In addition to updating the zoning By-Laws, Brookline has set specific goals for the next five years to protect its remaining open space. These goals and objectives are clearly described in its Open Space Plan 2000.

RECOMMENDATIONS

Expand Open Space in Brookline

Though Brookline is largely built-out, new zoning could optimize existing open space by directing new construction to those areas already densely built. A few of the options Brookline is looking into in terms of open space include acquiring Fisher Hill Reservoir, conversion of the former Newton Street Landfill to accessible open space, and evaluation of protecting parcels in Brookline that are part of the Charles-to-Charles greenway corridor such as Allandale Farm, Dexter School and Hellenic College [3].

Protect existing open space

As mentioned in the Biological Resources chapter, Brookline should make it a goal to designate more of its open space as protected land. Currently 56% of open space is unprotected, leaving these areas vulnerable to development.

Develop incentives to reduce impervious surface areas

No special permit is typically required to pave a tract of earth for a driveway or other purpose. In the interest of taking steps to reduce the amount of impervious surface added each year, the Town should consider changing this policy. Upon applying for a permit to pave, an individual could be presented with information about alternatives to pavement such as loose gravel, pavers, or bricks. The information could include a cost comparison chart. Individuals could be given even greater incentive to surface their property with an alternative to asphalt by issuing two separate permits, one for pavement, and a less expensive one for alternatives to asphalt. By pricing the permit for laying permeable surfaces at less than the cost of a permit for laying asphalt citizens may be persuaded to choose an alternative over traditional impermeable pavement. Pavement is largely responsible for holding heat, which in turn can lead to the development of health threatening microclimates in cities.

Develop erosion control by-law

In the interest of reducing the loss of top soil at construction sites due to runoff, it is recommended that the Town require silt fence and hay bales during the construction and that all new building sites be landscaped in such a way as to minimize erosion.

SOURCES

1. Personal communication, Rachid Belhocine, Assessor's Office, Town of Brookline, April 2001.
2. Brookline Planning & Community Development, Parks, Open Space, and Greenways Issues and Opportunities Report." Town of Brookline.
3. Brookline Conservation Commission, "Open Space 2000," Town of Brookline, February 2000.
4. Personal communication: Charles Barry, Engineering Department, Town of Brookline, April 2001.
5. Brookline Department of Planning and Community Development, <http://www.town.brookline.ma.us>, March 2001.

TRANSPORTATION



Why examine TRANSPORTATION?

One of the most significant threats to community sustainability is use of the personal automobile. In 1995, the transportation sector produced 22% of Brookline’s total greenhouse gas emissions. Together gas and diesel powered vehicles operated by town employees and residents released 140,938 tons of equivalent carbon dioxide (eCO₂) into the atmosphere in 1998. Calculated at the current rate of increase this figure is expected to increase to 152,207 by the year 2010. A majority of scientists now agree that emissions of “greenhouse gases,” specifically carbon dioxide and methane produced by the burning of fossil fuels, cause a change in the earth’s climate. Scientists predict that we will experience global alterations in weather patterns, ocean currents, and biological processes as these gases accumulate in the atmosphere.

Efficient transportation options are essential for a well functioning community. However, the goal of maximizing efficiency needs to be balanced with environmental soundness, in order to keep pollution at a low level, preserve air quality, keep waterways clean, and maintain visibility within the environment. Making low or zero emission forms of transportation available to residents protects both humans and wildlife. Improving accessibility to frequent travel destinations (work, school, commercial areas) through smart land-use planning reduces travel distances and emission of pollutants.

Findings of Sustainability Inventory

Summary of Data Points	Revealing Facts
What are the average vehicles miles traveled (VMT) per capita in Brookline?	15 miles per person per day
What is the average speed of travel?	26 mph
How many miles per gallon does the average automobile obtain in Brookline?	This information is not available specific to Brookline. In general, the average passenger car is rated at 21.4 mpg.
What is the number of work trips by A) Public transit B) Car/Van?	According to a 1990 report, 8,256 people out of the 30,668 workers in Brookline took some form of public transit to work. 16,624 people chose to commute to work by car or van.
What percentage of streets is suited for bicycle and pedestrian travel?	According to Peter Sellers, Director of Highway and Sanitation, approximately 90% of streets in Brookline are equipped with sidewalks and suitable for pedestrian access. Brookline currently does not measure bicycle access in town.

Recommendations

- ◆ Increase the quality of the MBTA service
- ◆ Promote telecommuting and flexible scheduling
- ◆ Improve infrastructure for alternatively-fueled vehicles
- ◆ Give financial incentives to consumers
- ◆ Improve bicycle access

Making the Sustainability Connection Through Interdepartmental Partnerships

Increase and improve transportation alternatives for commuters

Transportation Division, Health Department, Planning & Community Development

Improve Infrastructure for alternatively-fueled vehicles

Transportation Division, Planning & Community Development, Highway Division



PRESSURE: STRESSORS ON A RESOURCE

In order to set a goal to reduce automobile dependency it is necessary to know the number of daily vehicle miles traveled (VMT) per capita. The average speed of travel reflects the state of traffic flow. The following table indicates VMT data [2]:

VMT per capita for Brookline	15 miles daily
Average speed of travel	26 mph

(Source: Vijay Mahal, CTPS)

Documenting both the median and mean travel time for trips to work provides an indication of how accessible the average worker's place of employment is. The table below summarizes median and mean commute times [3].

Travel Time- 1990 (Minutes)		
Mode	Median Travel Time	Mean Travel Time
Drove alone:	22	22.1
2 person carpool:	21.1	20.9
3 person carpool:	24	25.1
4 person carpool:	24.6	28.5
5 person carpool:	64.9	52.6
7-9 person carpool:	62.1	46.7
10+ person carpool:	37.9	38.3
Bus:	32	31.3
Streetcar:	33	32.0
Subway:	34.1	34.8
Rail:	78	55.8
Taxi:	18.5	17.6
Motorcycle:	9.2	7.8
Bicycle:	20.8	19.4
Walked:	16.8	15.6
Other:	24.6	38.9
Work at home:	0	0

(Source: 1990 Census Transportation Package)

To raise public awareness of fuel consumption and to inform legislators it is helpful to know the number of miles per gallon of the average automobile. The Massachusetts Registry of Motor Vehicles reports the following information about fuel efficiency:

Passenger cars	21.4 mpg
Passenger cars and other 2-axle, 4 tire vehicles	19.6 mpg

Data on the average miles per gallon for automobiles registered in Brookline is not recorded [5]. However, the registry does document the number and type of vehicles registered to citizens living in Brookline. The following table lists the number of automobiles registered in Brookline according to vehicle classification:

Vehicle	Total # Registered
Passenger cars	27,573
Light Trucks (under 10,000 lbs.)	5,533
Heavy Trucks (over 10,000 lbs.)	137
Motorcycles	336
Other	171
Total vehicles	34,022



STATE: QUALITY OF A RESOURCE

Accessibility of Mass Transit

To efficiently evaluate public access to transit, it is important to know what percent of the population lives and works within a 10-15 minute walk (3/4 of a mile) of a transit stop or commercial street. Paul Reim of CTPS calculated a 3/4 -mile buffer around Beacon Street and Commonwealth Avenue (both serviced by public transportation) and summed up the population inside the buffer for both 1990 and 2000 [6].

	1990	2000
Total Population Inside the 3/4 mile buffer	42,432 (77.6%)	44,832 (78.5%)
Total Brookline Population	54,718	57,107

(Source: Paul Reim, CTPS)

Considering also the MBTA D-line and the various bus routes, the majority of Brookline residents have access to public transit.

Documenting the number of citizens utilizing various modes of transportation for commuting to work identifies preferences and assists with setting goals for non-polluting means of transportation. Modes of transportation and associated numbers of travelers are indicated below. This chart is based upon the U.S. Census estimate that Brookline had 30,668 total workers ages 16 years and older in 1990.

Mode of Transportation-1990

<u>Mode:</u>	<u>Number:</u>	<u>% of Total</u>
Drove Alone	14,168	46.2%
2 person carpool	1,926	6.28%
3 person carpool	259	0.84%
4 person carpool	169	0.55%
>4 person carpool	102	0.33%
Bus	2041	6.66%
Streetcar	3471	11.32%
Subway	2744	8.95%
Rail	56	0.18%
Taxi	78	0.25%
Motorcycle	20	0.065%
Bicycle	534	1.74%
Walked	3,459	11.28%
Other	88	0.287%
Work at home	1,553	5.06%

(Source: 1990 Census Transportation Planning Package)

For comparison purposes, Boston had a workforce of 1,488,501 in 1990 (individuals 16 years and older). Of these individuals, 65.8% drove alone to work; 9.8% car-pooled; 14.2% used public transportation; and the remaining 10.2% used other means to commute. The state reported a workforce of 2,979,594 (individuals 16 years and older) and estimated that 72.1% of workers drove alone, 10.7% car-pooled, 8.3% utilized public transportation, and the remaining 8.9% used other means to commute to work (3).

Pedestrian and Bicycle Friendly Streets

To highlight a potential shortage of pedestrian-friendly streets it is advantageous to note the percentage of streets that accommodate walkers and cyclists. Approximately 90% of Brookline’s streets contain sidewalks that provide access for pedestrian travel. At this time, the Town does not measure bicycle accessibility [7].

Budget allocation

To evaluate budget allocation for single occupant vehicle transportation vs. fuel conserving transportation it is helpful to compare the annual monies spent on building, and maintaining roadways, to the monies spent on public transit and/or non to low polluting forms of transportation. The following are figures for Brookline [8]:

Building/Maintaining Roadways	Public Transit, etc.
<ul style="list-style-type: none"> ◆ \$1,539,000 in 2001 to build and support road infrastructure ◆ \$150,000 paid for sidewalk and bridge repair (2001). 	<ul style="list-style-type: none"> ◆ \$5,251,271 paid to the MBTA for fiscal year 2001.

(Source: Sean Cronin, Selectman’s Office)

Availability of alternative fueling stations

As part of a goal to increase the use of alternatively fueled vehicles, a natural gas filling station at the highway garage could be a viable long-term solution for Brookline. At the current time, there are no compressed natural gas (CNG) or electric service stations in the town.

Involvement in voluntary ride-share programs

Measuring the number of commuters who participate in voluntary ride-share or other similar government sponsored commuter programs is required to gauge the level of citizen involvement in traffic/emission reducing initiatives. Of Brookline’s workforce, 2,456 of 30,668, or 8% participate [9]. Car sharing is another transportation initiative that is becoming increasingly popular. Car sharing programs allow residents to rent vehicles for use on an hourly basis. Zip Car operates such a program and stores three cars in Brookline for use by individuals who pay a membership fee for the service. This provides a practical alternative to car ownership [10].

Transportation infrastructures

The proportionately large number of commuters who walk to work (3,459 or 11.2%), or bicycle to work (534 or 1.7%) out of a total working population of 30,668 indicates that Brookline’s land use and zoning regulations serve relatively well to promote accessibility of common destination points. Brookline’s current policy of creating new sidewalks or enlarging existing ones whenever road repair is required further supports pedestrian activity between destinations [7].



RESPONSE: ACTIONS THE TOWN OF BROOKLINE IS TAKING

Brookline has already taken laudable steps to address transportation issues. Several referred to in the Local Action Plan on Climate Change are:

Alternatives to automobiles

Brookline continues to make adjustments so the community may become more pedestrian and bicycle friendly. Bicycle units have been introduced to the police force, and Brookline continues to support the Urban Ring Project. If this project is carried out, crucial public transportation and economic links between Cambridge, Everett, Chelsea, Boston, and Somerville will be provided, having an impact on regional transportation patterns.

Budget allocations for transportation

The Greenhouse Gas Inventory & Forecast Report also notes that for five years the Town has included in its capital budget funding to enable the Department of Public Works (DPW) to upgrade many of its fleet vehicles and maintenance equipment. Old inefficient engines on our smaller engine vehicles have been replaced with superior ones, which contribute less CO₂ to the environment. The report states that under this program the DPW have replaced many gasoline powered vehicles with diesel models, a switch which saves money in the long term and cuts mileage, but does little to reduce air pollution. The town purchased two highly efficient hybrid gasoline/electric motor vehicles in FY 2002 and has proposed the purchase of three more, in order to begin cutting emissions and set examples for the community.

RECOMMENDATIONS

Implement transportation goals from Brookline's Climate Action Plan

In order to ensure sustainable transportation options are available Brookline should execute its transportation section of the Local Action Plan on Climate Change. The Greenhouse Gas Inventory & Forecast Report also lists several proposals to further help reduce greenhouse gas emissions.

Increasing the quality of MBTA service

Lobby the Transit Authority to improve its service within Brookline. Improvements to recommend: the purchase of clean fuel buses, installation of bus shelters with schedules and maps, more frequent green line service with expanded capacity at peak hours, expanded bus routes, provision of bus transfers, bicycle racks on buses, and a freeze on fare increases.

Promote telecommuting and flexible scheduling

The town could provide the technology and flexibility for certain municipal employees to telecommute, working from home and thereby reduce their trips to work. A program could also be implemented to provide incentives to Brookline based businesses to offer telecommuting options to their employees as well, parking cash-out, this is a strategy whereby employers would encourage their workers to leave their cars at home and utilize alternative modes of transportation for commuting, by paying individuals the equivalent cost of parking.

Improve infrastructure for alternatively- fueled vehicles

The town could take the steps it has already initiated to cut fuel emissions even further by upgrading its fleet from petrochemical fueled cars and trucks to green vehicles powered by fuel cells or electricity. By replacing the conventional municipal fleet with alternative energy vehicles the town of Brookline would immediately reduce 14 percent of the emissions produced daily by the community [1]. A “green fleet” would send a strong and persuasive message to the citizens of Brookline and would help to address unsustainable consumer trends. Model green fleet programs Brookline could examine include Denver, Colorado and Ann Arbor, Michigan.

Financial Incentives to Consumers

The town could build on its commitment to cut emissions by providing financial incentives to consumers. For example, the town could reduce or cut the excise tax on automobiles that operate on renewable fuel.

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6. Personal communication, Paul Reim, Central Transportation Planning Staff, April 2001.
7. Personal communication, Peter Sellers, Highway and Sanitation Department, Town of Brookline, September 2001.
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WASTE



Why examine WASTE?

Waste accumulates on a daily basis as we produce, consume, and dispose of materials. Community consumption levels act as an indicator for municipal programs that encourage waste reduction, such as recycling and composting. In order to keep our environment free of toxics and our streets clean, we need to dispose of our wastes in an ecologically sound manner. Jobs are created when we manage our waste by recycling or composting it, rather than dumping it into our environment. Purchasing products that are durable, re-usable, and reflect what we truly need reduces the amount of waste. A sustainable community therefore recycles, re-uses, composts, buys durable products and makes responsible purchases.

In Brookline, the Sanitation Division of the Department of Public Works is responsible for “the collection and disposal of residential and municipal generated solid waste including recyclable waste products and household hazardous waste” [2].

Findings of Sustainability Inventory

Summary of Data Points	Revealing Facts
How many annual tons of waste is incinerated in Brookline?	The amount of waste sent to Maine for incineration in FY 2000 totaled 13,026.24 tons. For FY 2001, this figure decreased to 12,779 tons.
How much waste is generated per resident?	There was 0.98 tons of waste generated per resident in 1998.
What is Brookline’s recycling rate?	Brookline’s recycling rates were recorded as 38% (1998); 39% (1999); 35% (2000).
Amount of hazardous waste generated by the Town of Brookline?	Approximately 6,030 gallons of hazardous waste was collected at the annual Brookline Household Hazardous Waste Collection Day in May 2001.
List voluntary and mandatory programs that reduce solid waste or hazardous waste. Note level of involvement or compliance.	The town provides recycling bins and composting bins for its residents. The local by-laws require all residents on municipal waste service to recycle. 35% of total materials collected by the town in 2000 were recycled. To date, over 600 composting bins have been sold to residents [4].
Number of facilities where residents can recycle materials, buy re-used goods, etc.?	Brookline provides a recycling drop-off for residents, hosts an annual hazardous waste collection event, and a smaller paint collection event. There are various stores in the area that accept recycled materials such as Mailboxes, Etc. and Stop and Shop.
How many Superfund (National Priority List) sites exist vs. will be cleaned up in the next year?	There are currently no Superfund sites in Brookline.

Recommendations

- ◆ Increase the recycling rate with more proactive programs
- ◆ Create a by-law requiring private haulers to provide recycling services to Brookline customers

Making the Sustainability Connection Through Interdepartmental Partnerships

Increase the recycling percentage rate

Department of Public Works, Planning & Community Development, Economic Development



PRESSURE: STRESSORS ON A RESOURCE

Annual tonnage of solid waste

Pressures from waste production compromise the quality of land, water, and air. Additionally, there are limits to the land area available for waste disposal. Currently, the Brookline Sanitation Division services 12,964 of the estimated 24,000 households in Brookline for solid waste removal and recycling services. In FY2000, 13,026.24 tons of solid waste was sent to Maine for incineration. Due to successful recycling and composting opportunities in the town, this number dropped to 12,779 in FY2001 [6]. Utilizing the current number of households serviced (12,964) and the 2001 waste tonnage (12,779) provides a conservative estimate of approximately 0.985 tons of waste per household per year.

Limitations of private haulers

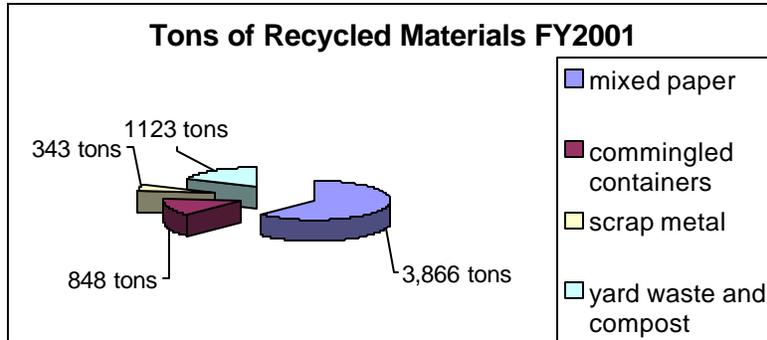
Another significant pressure is the limited control the town has over the private haulers that service apartments and other residences for which the town does not provide waste hauling. There are currently no requirements of these private haulers to provide recycling services.



STATE: QUALITY OF A RESOURCE

Recycling rate

The percentage of waste recycled reduces the amount of waste that is sent to the incinerator. In fiscal year 1999, the town of Brookline recycled 3,617 tons of mixed paper, 857 tons of commingled materials, 206 tons of scrap metal, and 3,022 tons of yard waste and compost (refer to the pie chart below). In fiscal year 2001, Brookline recycled 3,866 tons of mixed paper, 848 tons of commingled containers, 343 tons of scrap metal, and 1,123 tons of yard waste and compost [4].



Location of landfills, incinerators, hazardous waste sites

The location of hazardous waste sites, landfills, and transfer stations determine if the towns own waste directly affects the community. The locations of such waste facilities are also important when considering environmental justice issues, to assure that minority or poorer communities are not being disproportionately burdened. Currently, there are no hazardous waste sites within Brookline. A transfer station is located on Newton Street, which is also the location of a former landfill in operation from 1936 to 1975 [3]. An estimated 141,744 tons of non-burnable solid waste was disposed of in this 12.75-acre area [9]. The waste that Brookline incinerates is sent to a facility located in Maine and therefore does not have a direct impact on the community itself.

A recycling drop off center is located on Centre Street that provides recycling to residents whose haulers do not provide the service [3].



RESPONSE: ACTIONS THE TOWN OF BROOKLINE IS TAKING

Brookline’s Recycling Program

The town of Brookline provides an extensive recycling program to both residential and commercial customers. Materials recycled include newspapers, phone books, corrugated cardboard, glass bottles and jars, aluminum, aerosol cans, and plastic bottles numbered 1 and 2 [10]. Brookline also provides a household hazardous waste collection day once a year [4].

The 1998 recycling rate for Brookline, as provided by the Massachusetts Department of Environmental Protection, was 38%. This number increased to 39% in 1999, but then dropped in 2000 to 35%. The decrease was due to a drop in yard waste tonnage recycled. Brookline is presently undertaking various initiatives to increase the recycling rate and educate citizens and businesses on proper recycling guidelines.

Facilities where residents can recycle waste and buy recycled goods

A 24-hour recycling drop off center available to residents is located on Centre Street in Brookline. Likewise, every spring the town provides a household hazardous waste collection day [4]. There are two drop-off locations in Brookline for used oil- “Valvoline” located at 275 Boylston Street and “JD Exxon” at 320 Newton Street. Ni-cad or other rechargeable batteries can be recycled at the DPW in Town Hall, as well as the Putterham Library Branch. There are over 10 different businesses involved in the recycling of materials in Brookline including: the MA Homeless Alliance, Salvation Army, and Goodwill Industries [8].

RECOMMENDATIONS

Increase Recycling through Incentives

Currently, the town provides recycling bins and composting bins for its residents. The local by-laws require all residents on municipal waste service to recycle. Composting bins may be purchased at a discounted rate by the town. Brookline should continue its focus on recycling and composting within the community. The town should work to increase its recycling rate through public education programs and incentives by creating more incentives and through enforcement of local by-laws. Additionally, it is recommended that Brookline create a new emphasis on producing less waste overall. The town should consider incentives to encourage less waste per household. One possible method would be to limit the amount of trash that each household is allowed to put out each week for curbside pick up. Another option would be to participate in a “Charge per Bag” program, where each household has to purchase specific bags in order for municipal pick up. The city of Worcester initiated this program and could be used as a model.

Create By-Law for private haulers

Currently, Brookline services approximately 54% of the total households in town. Private haulers service the remaining households [3]. These private waste haulers maintain little to no data on the amount of waste picked up specifically in Brookline. This presents a problem as Brookline cannot set reduction goals without knowing accurate data on how much waste is being produced by each resident. Therefore, it is important to encourage or require these private haulers to maintain the same standards of data collection as the town and to offer recycling and composting options to the residents. Brookline cannot make a reduction goal if it does not know the total amount of waste produced by the community. A by-law requiring private haulers to provide recycling and composting services was also recommended in the Local Action Plan on Climate Change. Refer to that report for further information.

Make Waste Reduction a Community Goal

The town of Brookline should supply the residents with the annual tonnage of non-recycled and recycled waste. One way to make this information more readily available is by providing it on the website. Information, such as the goal for recycling and the actual recycling rates, can be shown in a chart form to emphasize the need for an increase in activities and exemplify the satisfaction of achieving the goals for the town. Making waste reduction a community goal increases resident involvement and therefore sustainability.

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9. Calahong, Jackie, “Draft Action Plan (Model Two)”, Town of Brookline, May 2001.

WATER



Why examine WATER RESOURCES?

Human populations are directly impacted by the quality and quantity of accessible drinking water. It is imperative that any community striving to be sustainable considers impacts on its drinking water supply, surrounding water bodies, and wastewater effluent as well as the health of regional watersheds. Polluted runoff can poison freshwater and marine life damaging food sources for wildlife and human life. Changes in watershed health can impact crop growth damaging significant sources of food for livestock and human consumption. Poor management of wastewater emissions can pollute entire harbors ruining shellfish populations and diminishing recreational opportunities. Through regular assessment of water quality, water conservation, and regional watershed health a sustainable community can ensure safe drinking water and protect natural resources over the long term.

Findings of Sustainability Inventory

Summary of Data Points	Revealing Facts
What are Brookline's water consumption levels?	In 1998, 1,950 million gallons of water was purchased from the Massachusetts Water Resource Authority (MWRA).
How many gallons of wastewater are discharged to the (MWRA)?	In 1998, 4,457 million gallons of wastewater was discharged to the MWRA.
What is the greatest threat to surrounding water bodies?	Non-point source pollution is the greatest threat.
How does the EPA Rate the water quality of the Charles River?	The EPA rates the water quality at a "6" - More serious problems-High vulnerability. (2000)
How many drinking water violations occurred in Brookline?	Only 1 violation occurred in 1999. (1998-2000)
How many MWRA Deer Island Violations occurred?	In 1998, there were 41 qualified violations at the Deer Island Facility.
What is the result of the Testing of swimmability/fishability in town water bodies?	There are no tests for these measures in Brookline.
Are there programs that address NPS pollution education?	Yes, see Response Section;
What are the levels of Fertilizer/Pesticide/Herbicide use in Brookline?	For the year 2000, the town used a total of 22,485 pounds of fertilizer and 393.35 pounds of pesticides.

Recommendations

- ◆
- ◆ Initiate communication with local governments in nearby communities in order to improve mitigation and restoration efforts of Charles River
- ◆ Measure herbicide/pesticide/fertilizer use
- ◆ Initiate and implement a Watershed Education Program
- ◆ Initiate a Stormwater Management By-law to control Non-Point Source Pollution

Making the Sustainability Connection Through Interdepartmental Partnerships

Save money by reducing herbicide/pesticide/fertilizer use

Recreation, Parks and Open Space Division,
School, and Highway Division

Improve community NPS pollution education

Health, School, Recreation Department

Implement Storm Water Management By-law

Parks and Open Space Division, Planning and
Community Development, Water & Sewer, and



PRESSURE: STRESSORS ON A RESOURCE

Water Use

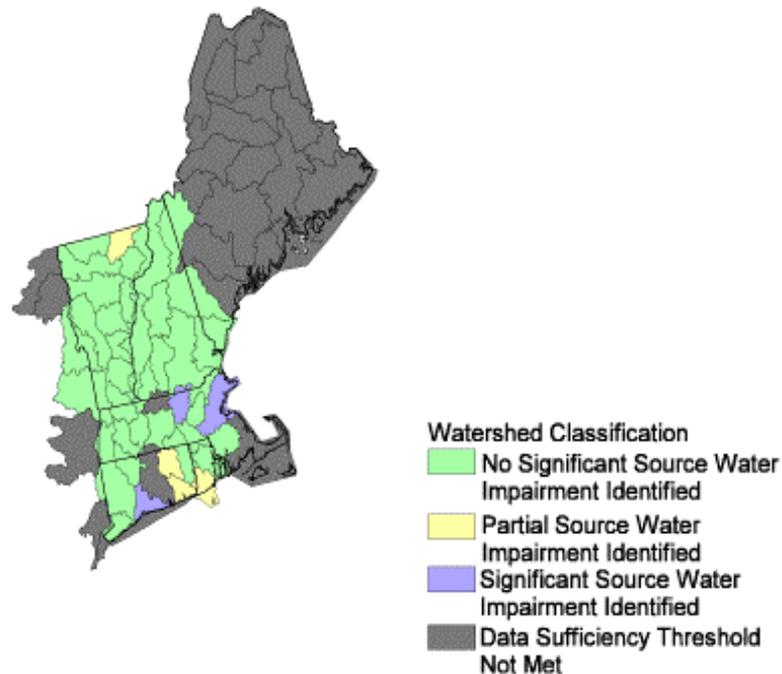
Water conservation reduces the hydrological impacts of removing water from a source watershed, depositing wastewater in a receiving watershed, and ultimately saves money at both the municipal and residential levels. In order to set goals for water consumption reduction it is necessary to obtain baseline information on the gallons of water consumed by the community. Records of water purchased from the Massachusetts Water Resources Authority (MWRA) indicate that Brookline consumed 1,950 million gallons in 1998 and 1884 million gallons in the year 2000. According to town census population data this amounts to 36,700 gal/capita/year or 100.5 gal/capita/day in 1998 and 34,400 gal/capita/yr or 94.2 gal/capita/day in 2000 [1]. Consumption was 66 million gallons less in 2000 than 1998. This may, in part, be attributed to a cooler summer in 2000 ultimately reducing community water use. Per capita use of public water supplies in the United States averaged 183 gallons per day in 1990 [2].

The following is a table of the number of gallons consumed by Brookline broken down by sector [1].

		Gallons Sold/Consumed per year			
	Residential	Commercial	Agricultural	Municipal	Total
1998	1680 million	126 million	86 million	57 million	1950 million
2000	1618 million	122 million	98 million	47 million	1884 million

Drinking Water Source

In order to ensure protection of town drinking water it is necessary to determine the location and nature of drinking water sources. Currently there is one drinking water source in Brookline, a spring at the Holy Transfiguration Monastery. The majority of Brookline's water is derived from a distant surface water source in Western Massachusetts [3]. The following map indicates source water conditions in EPA Region 1 from 1990-1997:



(Source: EPA Indicators of Source Water Condition, http://www.epa.gov/iwi/1998oct/ii3_r1map.html)
Brookline falls under the category shaded blue, "Significant Source Water Impairment Identified."

Drinking Water Supply

One aspect of watershed protection involves managing water resources to avoid depleting them beyond healthy recharge rates. Currently the MWRA manages service to 62 communities in metro-Boston. The MWRA withdraws on average about 270 million gal/day from the Quabbin while the safe yield is 350 million gal/day [1].

Wastewater

The aggregate quantity of polluted water that a community discharges is an indicator of its impact on receiving waters. In 1998, Brookline discharged 4,457 million gallons of wastewater to the MWRA with an average daily flow of 12.21 million gallons. In 1999, it discharged 3,792 million gallons with an average daily flow of 10.39 million gallons [4; 5]. This amounts to a 655 million gallon reduction in 1999.

Major Threat to Local Water Bodies

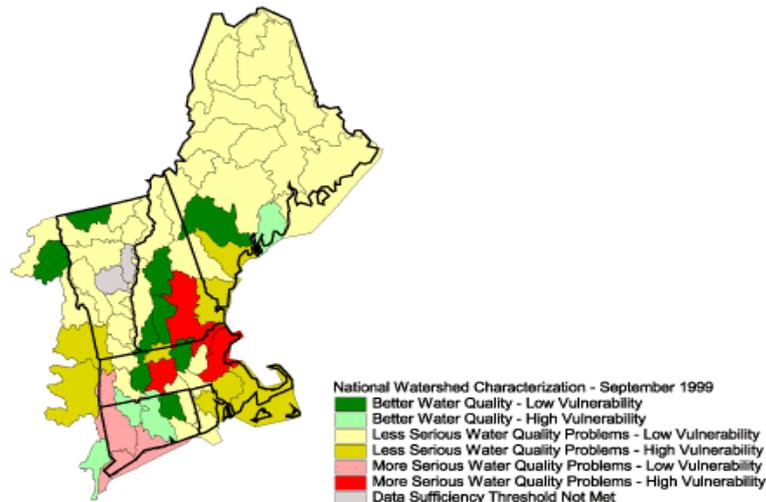
It is important to identify the major threats within a community to its own recreational water resources. Brookline currently has no facilities that require National Pollutant Discharge Elimination System (NPDES) permits and no combined sewer overflow points (CSOs) [6]. The largest contributing factor to surface water degradation in Brookline is non-point source pollution (NPS). Non-point source pollution occurs when rainfall, snowmelt, or irrigation runs over land or through soil, acquires pollutants, and either introduces them into ground water or deposits them into rivers, lakes, or coastal waters. NPS pollution is currently the single greatest threat to water quality in the U.S. [13].



STATE: QUALITY OF A RESOURCE

EPA Watershed Rating

Brookline lies within the Charles River watershed. Thus, the quality of the runoff from Brookline's land area has an effect on the water quality in the river. In recent years water quality in the Charles has been the focus of local attention with ongoing efforts to clean up the river. Although much progress has been made, the EPA Index of Watershed Indicators rates the ambient surface water quality of the Charles River Watershed as a six, indicating "More serious problems-High Vulnerability to stressors such as pollutant loadings [7]." The map below depicts surrounding New England watersheds and their relevant ratings compared to the Charles River watershed.



(Source: Environmental Protection Agency, *Surf Your Watershed*, <http://www.epa.gov>, July 2001).

Drinking water violations

In order to ensure safe drinking water quality for the town it is important to stay abreast of any violations of standards for the town's drinking water supply. Between 1998 and 2000 there was only one violation of federal drinking water standards in the town. It was given in 1999 for failure to properly educate residents about threats related to lead and copper. Prompt compliance was achieved by February 2000 [6]. By

comparison, of the more than 55,000 Community Water Systems in the United States, only 4,769 or 8.6 percent reported a violation of one or more drinking water health standards in 1996 [8].

NPDES Violations

Brookline does not have any National Pollutant Discharge Elimination System (NPDES) permitted facilities so it has no violations. However, as stated above, nonpoint source pollution is a serious concern in Brookline. The town has already taken steps to address non-point source pollution impacts by entering, along with other communities in the lower basin, into a consent agreement with the EPA in 1995 with the goal of achieving Charles River Fishable/Swimmable standards by 2005 [3; 6].

MWRA Violations at Deer Island

Brookline discharges its wastewater to the MWRA's Deer Island facility and therefore bears some responsibility for Deer Island's NPDES violations. In 1998 the Deer Island facility had a total of 41 violations of the interim limits set for the facility by a federal court order. There was one violation of volatile solids reduction levels that occurred because the solids were not dumped into the harbor, but instead trucked to a fertilizer-making facility. There were 40 pH minimum violations at the Deer Island facility because the lowered pH levels were the result of a new improved treatment technology, which is exempt from a violation. In the year 2000, there were 110 pH minimum violations that were qualified for the same reason as the 1998 pH violations. After the completion of the new outfall pipe in Boston Harbor in September of that year, the quality of wastewater emissions from Deer Island greatly improved. However, two violations did occur in December, an unqualified pH minimum violation and an unqualified chlorine residual violation [9].

Swimmability/Fishability

There are no town, state, or federal organizations that regularly test the water bodies in Brookline for swimmability and fishability. The Charles River Watershed Association tests the river at various locations other than Brookline once a month (Boston, Milford, Bellingham, Franklin, Norfolk, Millis, Medfield, Sherborn, Natick, Dover, Dedham, Newton, Wellesley, Cambridge, and Brighton) [16]. The Department of Environmental Protection (DEP) will test the region in 2002 and will only test in Brookline per request. The Muddy River has been tested in conjunction with the restoration project planning and permitting [10; 11].

MWRA Treatment Plant Capacity

It is important to assess whether wastewater emissions treatment facilities for a community are adequate and if they will continue to meet treatment needs in the future. In Brookline's case this corresponds to the adequacy of the MWRA's Deer Island facility to meet the needs of the greater Boston area. The Deer Island plant has recently added secondary wastewater treatment and a new outfall pipe that extends over nine miles into Boston Harbor. The upgrades only account for a 10% increase in the future of the plant's serviced population. This is because the MWRA intends to focus on reducing wastewater emissions in the future rather than increasing treatment capacity. According to Kenneth Chin, a MWRA design engineer for the new facility and outfall pipe, the Deer Island plant does meet Boston's needs and is likely to continue to do so. Deer Island currently has a capacity of 1,400-1,500 mil/gal/day under normal conditions and a capacity of 1,270 mil/gal/day under extreme conditions (simultaneous high tide, full moon, and large storm event). Current normal emissions are well below this capacity with an average flow of 400 mil/gal/day and highs of near 600 mil/gal/day [12].

Fertilizer/Herbicide/Pesticide Use

A town can have significant detrimental impacts on surrounding water bodies through the application of fertilizers, herbicides, and pesticides. In order to take steps to reduce or mitigate the effects of such chemicals on local water quality it is necessary to measure current levels of application. In the year 2000, the Town of Brookline used a total of 22,485 pounds of fertilizers and 393.35 pounds of pesticides [18].



RESPONSE: ACTIONS THE TOWN OF BROOKLINE IS TAKING

Protection for Local Water Resources

It is important for a community to determine if it has adequate protection for its water resources through federal, state, and local regulations. The Massachusetts Wetlands Protection Act, minus its exemption for public utilities, and the Massachusetts Rivers Protection Act currently work to provide some measure of protection for Brookline's water bodies. Brookline has no local regulations of its own that protect sensitive hydrological features, but it is possible that policy measures will arise following the implementation of the Muddy River Restoration project (expected completion-2006) [3; 10].

Water Conservation Programs

In order to reduce the impact of a community's wastewater on receiving waters it is important to design programs at the local level that address water consumption and/or effluent reduction. Since 1998, there have been no municipal, state, or federal programs that address water consumption or household wastewater reduction in Brookline [1].

Wastewater Emissions Reduction Programs

Although there are no household wastewater reduction programs in Brookline the town is trying to address its nonpoint source pollution emissions. Along with its entrance into a consent agreement with the EPA to improve stormwater quality in 1995 the town has also allocated a great deal of resources into its capital improvements program. Based on the recommendations of the Wastewater System Master Plan, Brookline is upgrading the city's sewer system to eliminate illegal sewer connections and remove outdated pipes that foster the growth of harmful bacteria [3,5].

Watershed Protection Programs

It is important that local action on water quality issues be complemented by the examination of issues on a watershed scale. Brookline hasn't designed any programs that specifically address water pollution on a watershed scale, however, it does have regulations and programs that indirectly address regional water quality:

- ◆ For the past forty years the municipal capital improvements program has worked toward the reduction of problems associated with storm water pollution. [10].
- ◆ The Rules and Regulations Regarding the Use of Common Sewers for the Town Of Brookline and the Regulations for the Construction of Sanitary Sewer and Surface Water Drain Connections (last reviewed in 1980) allow the town to enforce the design aspects of the sewer system and prevent additional sources of pollution.
- ◆ In conjunction with city and state efforts support has been provided for wetland protection and restoration and the Emerald Necklace Environmental Improvements Master Plan.

- ◆ The Conservation Commission initiated a Community Education and Outreach Program with a brochure on storm water pollution prevention last year and a stormdrain stenciling program with participants in the federally funded City Year program.
- ◆ Additional water protection measures are currently under consideration as the town is drafting its new comprehensive plan [3].
- ◆ State and federal programs such as the U.S. Clean Water Act, NPDES Permit Program, MA Storm water Discharge Management Policy/Permit Program, the MA Wetlands Protection Act, and MA Rivers Protection Act complement these initiatives.

RECOMMENDATIONS

Continue to work on reducing nonpoint source pollution through community education programs - Be a Model!

Due to the excessive costs of large-scale facilities to remove non-point source pollution, changes in individual behavior provide the most desirable long-term solution to this problem. However, there are considerable challenges associated with this solution. Many people are either not aware of the impacts their choices have on the environment or do not value these impacts as more important than their own personal freedom of choice. In addition, a good portion of the public still believe that water in storm drains goes to the sewage treatment plant. In order to facilitate changes in individual choices, advocacy groups and local government must correct common misconceptions and foster a sense of stewardship among community members. This may be achieved by:

- ◆ Signage on local catch basins indicating the water's ultimate destination could help discourage litter and dumping, as well as educate local residents.
- ◆ Programs such as river cleanups, adopt-a-highway programs, and tree planting encourage public participation in activities that improve community spaces.
- ◆ Educational programs that address lawn design and maintenance with limited chemical inputs can considerably improve the quality of surrounding water bodies and reduce lawn care costs for residents.
- ◆ Some communities have found that the design and use of a local mascot for a water quality issue has been a successful way to get attention and encourage behavior modification (Chimacum, WA; Tacoma, WA; Pinellas Co., FL) [14].

Through these programs local and municipal organizations can educate residents and provide them with the valuable experience of protecting and improving their community water resources [15]. Brookline can also set a powerful example through its own land management practices acting as a model for the community.

Initiate communication with local governments in nearby communities in order to improve mitigation and restoration efforts of the Charles River

Because Brookline depends so heavily on the MWRA for both its drinking water supply and wastewater disposal, some water conservation issues are out of its direct control. As an integral part of the Charles River watershed, however, it might benefit Brookline to create a watershed protection group with other nearby communities in order to emphasize the importance of protecting local water bodies. Water knows no municipal boundaries and water conservation initiatives, capital improvement programs, and riparian restoration projects may be more successful if they are addressed on a larger scale through municipal cooperation.

Develop an accurate measure of fertilizer/herbicide/pesticide use and consider integrated pest management strategies for municipal grounds

Integrated pest management strategies (IPM) have recently shown promise as a way to reduce the costs of grounds management and reduce chemical inputs into local water bodies. Some land managers have found that through careful application natural alternatives to chemical fertilizers and pesticides are just as effective as their harsher counterparts [14]. By landscaping with the environment, or xeriscaping, one can reduce the amount of fertilizers, pesticides, and sediment that reach local water bodies. For instance, the addition of a small buffer area between a lawn and a water body can significantly reduce the chemical inputs from a treated lawn into a water resource. Additionally, the planting of native flora on municipal grounds can reduce watering, mulching, and chemical inputs. The use of natural pest controls like predator insects, bats, composting, and use of native plants can reduce or entirely negate the need for chemicals in gardening. The town may also want to consider a partnership with local water quality organizations to provide a means for residents to test their soil and determine the most effective way to manage their lawn with the least amount of chemical inputs.

Develop a Stormwater Management By-Law

Brookline is anticipating the new Phase II Stormwater Discharge Regulations by the Environmental Protection Agency (EPA) in 2004. Currently, Brookline is preparing to implement a Stormwater Management Plan that was developed in 1999 that will meet the EPA's standards. In order to meet these standards, the town should initiate a Stormwater Management By-Law that will further address sustainability at the local level.

The Municipality should take a lead role in water conservation efforts

Brookline should take on its own initiatives to conserve water. In turn, Brookline can educate the community on the actions it has undertaken on these sustainable practices, encouraging residents to become more involved in their own conservation efforts.

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SOCIO-ECONOMIC RESOURCES



“A sustainable society recognizes the limits of growth and looks for creative, alternative ways of growing.”
James Conner, Quest for a Sustainable Society, Oxford: Pergammon Press, 1979.

CIVIC INVOLVEMENT



Why examine CIVIC INVOLVEMENT?

Civic, municipal, and private business involvement is an essential component of a sustainable community. Citizen involvement means residents are giving back to their community by working to protect and improve their local environment, advocating for necessary services, and ensuring that political leaders have the goals and future of the community in mind. Municipal officials have a responsibility to local residents to solicit their input on important Town decisions. Local businesses have an inherent interest in the health and welfare of their community; they depend on local residents to supply their workforce as well as to provide a customer base. The active involvement of all three sectors fosters more effective communication between stakeholders and improves civic/municipal relations, making it easier to achieve common goals.

Findings of Sustainability Inventory

Summary of Data Points	Revealing Facts
What is the Voter Participation Rate at local and national elections?	In the 1996 national election, 75.8% of registered voters participated. In 1998 local and state elections, 19% of the Brookline population cast their votes.
What is the annual number of public meetings held in Brookline?	Records indicate there were 595 public meetings in 1998.
What is the financial contribution of local business?	In 1999, over \$500,000 was contributed to the Town by local business.

Recommendations

- ◆ Develop methods to assess local levels of civic involvement
- ◆ Undertake a short survey of local businesses to determine their contribution to the community
- ◆ Coordinate volunteer opportunities with Senior Center

Making the Sustainability Connection Through Interdepartmental Partnerships

Increase civic involvement

School Department, Economic Development, Planning and Community Development, Library, Information Technology, Retirement Board, Health Department, Parks and Open Space Division

Encourage local business involvement

Economic Development, Information Technology, Highway Division, Planning and Community Development, Transportation Department



STATE: QUALITY OF A RESOURCE

Voter Participation Rate

The percentage of registered voters within a community who choose to vote in local and national elections is an excellent indicator of resident involvement in local politics and concern for the welfare of the community. In the 1996 national election, 75.8% of registered voters in Brookline voted. Nineteen percent of registered voters in Brookline participated in the Town's election in November 1998 [1]. By comparison, 41.9% of registered voters in America voted in the 1996 national election [2].



RESPONSE: ACTIONS THE LOCAL GOVERNMENT ARE TAKING

Town Meetings

The number of public meetings in a community reflects the relationship between the local government and its citizens. According to town records, in 1998 Brookline held 595 public meetings addressing a variety of issues within the community, including meetings of the Board of Selectmen, Park and Recreation Commission, Conservation Commission, Tree Planting Committee, Solid Waste Advisory Board, Building Commission, Cemetery Trustees, Planning Board, Board of Appeals, Economic Development Board, Transportation Board, Preservation Commission, Health Commission, Commission for the Disabled, and numerous other special committees [1].

Local Business Involvement

Local business involvement in a community can be measured by the number of businesses that are either involved in community programs, contribute money to the community, or volunteer for community projects. A mail-in survey completed by Brookline's Economic Development Department found that in one single year (1999) local businesses cumulatively donated over \$500,000.00, with a median donation of \$910.00 [3].

RECOMMENDATIONS

On average Brookline has a substantially involved business and residential community. The voter participation rate in the national election was well above average and the town participates in a significant number of public meetings, encompassing issues ranging from domestic partnership benefits, to local development proposals and open space protection concerns.

Develop methods to regularly assess and improve upon local levels of civic involvement

Considering Brookline's high voter participation rate and number of public meetings, it is likely that residents donate a greater-than-average number of hours to the community. Unfortunately, data regarding a measure of civic involvement is not currently kept. The Town should consider periodic surveys of residents to discover: 1-where most volunteer energy is spent and thus determine which issues are most important to residents, 2-whether rates of volunteer involvement are increasing or declining, 3-how to most effectively motivate citizen participation.

Develop a voter education campaign

The 1998 voter turnout in Brookline was 19%, a figure that needs to be increased in order to boost citizen involvement in the democratic process. A campaign could be introduced to create a "Vote Brookline" team that would go door-to-door to register voters, as well as educate and encourage residents to get involved in community projects.

Open Space Outreach Coordinator

In order to take a more active role in educating citizens the Town should evaluate the possibility of hiring an Open Space Outreach Coordinator within the Parks and Open Space Division. This individual could focus on developing environmental education, coordinating meaningful volunteer opportunities, and making residents aware of sustainability measures in which they could participate.

Regularly undertake a short survey of local businesses to more accurately assess their contributions to the community

Brookline should consider regular assessments of local business involvement in the community. Data cited in this report comes from a survey taken in the year 2000 that, unfortunately, had a poor response rate and may not accurately represent the Brookline business community. By obtaining current and complete information on business involvement, the Town will be better equipped to determine potential funding sources within the business community. Without such an assessment, Brookline cannot properly recognize all businesses actively donating time and resources to the community.

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ECONOMY



Why examine the ECONOMY?

Healthy local economies provide the resources required to sustain community life. When communities do not have adequate resources it limits their ability to maintain high levels of health and education and to effectively protect the local environment. Unemployment rates, income distributions, and the number of persons receiving public assistance are conventional methods used to measure a community's economic health. However, when evaluating a community within the context of sustainability it is important to consider additional indicators that connect the economy to the local environment or social resources. Measures such as the town's commitment to environmentally friendly businesses, or efforts to employ residents locally in order to effectively reduce commuting times and vehicle emissions, not only provide information on what a community is doing to ensure its economic health, they also indicate how a community responds to indicators of its environment.

Findings of Sustainability Inventory

Summary of Data Points	Revealing Facts
What is Brookline's Unemployment Rate?	The unemployment rate in 1998 was 1.5%, which decreased slightly in 1999 to 1.4%.
What is the Unemployment Rate by Race in Brookline?	The unemployment rate is the highest for minorities- especially those not identifying as Black, White, Asian, or American Indian (1989).
How many individuals in Brookline utilize Medicaid Assistance?	1996 records indicate 5.06% of Brookline residents utilized Medicaid Assistance.
What are the local employment opportunities in Brookline?	The number of employment opportunities in Brookline decreased 7.76% between 1990-1996.
What is the Living Wage Designation?	A warrant article was passed at the November 13 th 2001 Brookline Town Meeting for the creation of a Living Wage By-Law, effective July 1, 2002. In summary, the article states "the town shall pay each of its employees no less than \$10.30 an hour except as provided in SECTION 4.8.5 and in collective bargaining agreements with the town under G.L. c. 150E, section 7."
What is the Economic Equity in Brookline?	The income distribution is relatively even tapering above \$75,000 (1989,1998).
How many Green Businesses are established in town?	There is one environmentally friendly Dry-Cleaner in Brookline.
What is the office vacancy rate in Brookline?	This information is not currently available.

Recommendations

- ◆ Provide incentives for local residents to seek local employment opportunities
- ◆ Implement a program that attracts “green” businesses through financial incentives and technical and business assistance
- ◆ Examine office/business vacancy rate and work to get more businesses located in Brookline

Making the Sustainability Connection Through Interdepartmental Partnerships

Green Business Programs

Economic Development, Parks & Open Space Division, Planning & Community Development, Public Works Department, Chamber of Commerce

Promote Local Employment

Economic Development, Planning & Community Development



PRESSURE: STRESSORS ON A RESOURCE

Unemployment Rate

A community’s unemployment rate can reveal a need for increased economic development or for more effective training programs for its work force. Two measures were taken on the level of unemployment in Brookline. The first, obtained from the Massachusetts Department of Employment and Training (MA DET) indicates that there were 473 unemployed persons in Brookline in 1998, corresponding to an unemployment rate of 1.5%. In 1999, there were 456 unemployed persons, a rate of 1.4%. The state unemployment rates for these years were 3.3% and 3.2% respectively [1].

Unemployment By Ethnicity

It is important to break down unemployment rates by race in order to determine whether particular ethnic groups suffer from unusually high unemployment rates and thus require special attention. The second measure of unemployment, categorized by race was obtained from the 1990 National Census, which indicates the demographics of unemployment in Brookline [2]:

Unemployment by Race (1990)

Ethnic Group	Number Employed	Unemployment Rate Within Race
White	1378	4.72%
Black	61	6.05%
American Indian/Eskimo	0	0%
Asian/Pacific Islander	69	3.28%
Other	58	20.20%

Source: 1990 National Census, <http://www.census.gov>, March 2001.

Brookline’s cumulative unemployment rate for 1990 was 2.4% [1].

Public Assistance

A measure of the number of persons on public assistance can be an indicator of economic independence within a community. In 1996, 2,887 Brookline residents received public assistance through Medicaid. By comparison, of the fifteen other communities in Massachusetts of similar size, only one, Arlington, has fewer Medicaid recipients [3].

Medicaid Recipients in Communities of 40,000-59,000 People

Geography	Total Recipients- Medicaid Count	Percentage of Total Population Receiving Medicaid (using 2000 Census Figures)
Holyoke	14,788	37.12%
Fitchburg	7,694	19.68%
Revere	7,429	15.71%
Pittsfield	6,487	14.17%
Chicopee	7,357	13.46%
Taunton	7,462	13.33%
Haverhill	7,512	12.74%
Malden	6,429	11.41%
Barnstable	4,497	9.40%
Plymouth	4,697	9.08%
Waltham	4,284	7.23%
Medford	3,886	6.97%
Peabody	3,296	6.85%
Brookline	2,887	5.06%
Arlington	1,637	3.86%

(Source: MassCHIP v2.6 r 217.0, MA Dept. of Public Health, Copyright 1995-2001, February, 2001 and <http://www.factfinder.census.gov>)

Local Employment Opportunities

One goal of a sustainable community is to reduce commuting distances, which can reduce vehicle emissions and enable alternative transportation modes, such as walking and biking. Communities can move toward this goal by finding ways to employ local residents within the community and by monitoring the growth of the local labor force with respect to the growth of local job opportunities. The largest employers in the Town of Brookline are the H.R. Institute, and Town government [13]. Data on the growth/decline of job opportunities within the community was obtained for the years between 1990 and 1996. According to this

data, employment within Brookline declined by 7.76% during this time period [1]. Between 1997 and 1999, the labor force grew by 0.129% [1]. This data suggests that the labor force may be slowly increasing while the number of local job opportunities is decreasing. This may correspond to the increase in commuting distances and vehicle emissions.



STATE: QUALITY OF A RESOURCE

Living Wage

To ensure that employees are receiving a wage to cover their minimum living expenses, a living wage is important to the economic health of a community’s citizens. At Town Meeting November 13, 2001, a warrant article was passed for the creation of a Living Wage By-Law, effective July 1, 2002. This article states that the town shall pay each of its employees no less than \$10.30 an hour except as provided in SECTION 4.8.5 and in collective bargaining agreements with the town under G.L. c. 150E, section 7. [4].

Economic Equity

The distribution of income within a community provides important demographic information that can help to gauge economic equity. Two measures of income distribution were taken in Brookline. The first was taken from the Brookline Health Department’s study, Healthy Brookline Vol. III (1999)[5]. The following results were obtained from this survey and shows that the majority of local households have an income of over \$50,000 per year.

Annual Household Income (1998)

Income	Number of Households in Brookline	Percentage of Households in Brookline
<\$10,000	58	7%
\$10,000-\$14,999	52	6%
\$15,000-\$19,999	47	6%
\$20,000-\$24,999	31	4%
\$25,000-\$34,999	66	8%
\$35,000-\$49,999	138	16%
\$50,000-\$74,999	180	21%
\$75,000-\$99,999	103	12%
\$100,000-\$149,999	86	10%
\$150,000+	94	11%
Total Respondents	855	

(Source: Healthy Brookline Vol. III 1999 Brookline Health Dept.)

In order to complement the above information the following data was taken from the 1990 National Census [6]:

Households By Family Income (1989)

<u>Income</u>	<u>Number of Households in Brookline</u>	<u>Percent of Households in Brookline</u>
<5,000	234	2%
5,000-9,999	260	2%
10,000-12,499	214	2%
12,500-14,999	138	1%
15,000-17,499	202	2%
17,500-19,999	180	2%
20,000-22,499	315	3%
22,500-24,999	246	2%
25,000-27,499	228	2%
27,500-29,999	284	2%
30,000-32,499	337	3%
32,500-34,999	216	2%
35,000-37,499	325	3%
37,500-39,999	206	2%
40,000-42,499	321	3%
42,500-44,999	217	2%
45,000-47,499	289	2%
47,500-49,999	292	2%
50,000-54,999	609	5%
55,000-59,999	603	5%
60,000-74,999	1530	13%
75,000-99,999	1568	13%
100,000-124,999	1053	9%
125,000-149,999	605	5%
150,000 +	1417	12%
Total Respondents	11889	

Source: 1990 National Census, <http://www.census.gov>, March 2001.

The results of both surveys were quite similar, showing a uniform income distribution in Brookline. Such an even income distribution is indicative of a diverse range of economic backgrounds that serve to balance community interests.

Office Vacancy Rates

Office vacancy rates indicate the real estate values in the local area and how buyers value the community. Although it has been noted that there are several commercial space vacancies in the three main commercial areas, no information on the office vacancy rate is recorded for the Town of Brookline [7,8].



RESPONSE: ACTIONS THE TOWN OF BROOKLINE IS TAKING

Green Business Assistance

A sustainable community works to foster environmentally friendly or “green” business and technology at the local level to ensure the success of cleaner technologies, and encourage responsible consumer behavior. Brookline currently has no financial or other assistance programs to offer green businesses. The state Department of Environmental Protection has a voluntary program, STEP, which provides services, including technical and business assistance, for businesses in Massachusetts that employ “green” technologies [9].

Lender Confidence

The number of lenders within a community indicates the level of confidence banks have in the economic development of the area. There are currently twelve lenders actively making loans in Brookline, demonstrating a high level of confidence in the town’s property values [10].

RECOMMENDATIONS

Brookline has fared well on many indicators of economic viability. Its low unemployment rate relative to state and national levels, and low levels of state assistance demonstrate a healthy economic environment. The twelve lending institutions in the town demonstrate strong investor confidence in Brookline and an enthusiasm for providing funds for further development. Brookline should focus on maintaining the character and vitality of its commercial centers.

Provide incentives for residents to seek local employment opportunities

The town has some economic areas that need attention. The number of jobs within the town seems to be decreasing while the labor force, or the number of persons over the age of 16 and able to work, is increasing. Brookline may want to consider a study that determines whether lost local jobs are going to nearby or distant communities.

Implement a program that attracts “green” businesses through financial incentives and technical and business assistance

Brookline should consider the possibility of instituting a “Green Business Network” or promoting economic incentives that encourage environmentally friendly businesses to locate in the area. Its educated and affluent residents are an excellent consumer base for green business, and this may encourage sustainable consumer behavior by local residents. Green business procurement may ensure future economic stability in Brookline as consumers become more aware of and dependent upon cleaner technologies. Berkeley, California and Portland, Oregon have both initiated “Green Business Networks” and can serve as case studies for Brookline.

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EDUCATION



Why examine EDUCATION?

The quality of community educational systems often determines where parents choose to raise their children. Prospective residents look for safe schools with small class sizes and exceptional student resources that will ensure that their children receive the best education possible. High quality, accessible education is also important to a community in a sustainability context. Education is the path to an informed citizenry, the ability of future generations to have a better life, and the foundation of a strong democracy. A quality educational system maximizes access to skills and knowledge needed to play a productive role in society, as well as to pursue self-fulfillment.

Findings of Sustainability Inventory

Summary of Data Points	Revealing Facts
Has there been a growth or decline in students entering/leaving the school system each year in Brookline?	The Department of Education reported a modest increase in school enrollment (0.29%) between 1994-1995 and 1997-1998 from 5,905 to 5,922 students. Year 2000 enrollment totaled 5,989 students.
What is the student to teacher ratio in schools?	There is 1 teacher for every 15.8 students in Brookline (1998).
What is the dropout rate for students?	The Department of Education reported the 1998 Brookline dropout rate for students was 0.1%, and 0.4% in 1999.
How many high school graduates plan to pursue higher education?	According to 1999 statistics, 83.4% of high school seniors within the District plan on attending a four-year college, 4.4% plan on enrolling at a two-year college, and 7.2% enter the workforce.
What are the per-pupil expenditures in the Brookline school systems?	In the school year 1998-1999, per pupil expenditures were \$8,563.00 for all day programs.
How many Community Environmental Education Programs exist?	There are 4 programs currently in place in Brookline.
What percentage of public schools offer environmental education in their curriculum?	100% of public schools in Brookline include environmental education in their curriculum.

Recommendations

- ◆ Develop community education programs around the sustainability concept
- ◆ Regularly monitor the adult English literacy rate and evaluate the needs of Russian and Asian communities
- ◆ Encourage educators to conserve resources and promote increased funding from the State

Making the Sustainability Connection Through Interdepartmental Partnerships

Increase community awareness of sustainability

School Department, Economic Development, Parks & Open Space Division, Library, Information Technology, Planning & Community Development

Improve English literacy in Brookline

School Department, Health Department, Economic Development, Adult & Community Education, Information Technology

Provide educational programs to support multigenerational literacy in English

School Department, Adult & Community Education



PRESSURE: STRESSORS ON A RESOURCE

Student Enrollment

In order to assess the annual demand on school resources from year-to-year it is important to measure any growth or decline in student enrollment in public schools. According to the Massachusetts Department of Education (DOE), between school years 1994-1995 and 1997-1998 enrollment in Brookline public schools increased from 5905 to 5922. This corresponds to a modest increase of 0.29%. This trend continued in 2000, with the enrollment of 5,989 students [1]. As of January 2001, enrollment in public schools reached just over 6,000 students, as private schools reached 6,800. It is important to note that some Brookline school districts have increased at a greater rate than others. Those districts seeing a particularly high enrollment increase are Baker and Lawrence Schools. Over the past ten years Baker School increased enrollment by 52%, requiring 3 expansion projects to accommodate the growth in student population.

There are eight public schools that offer elementary education to Brookline students. Brookline High School accommodates these students upon completion of the eighth grade. In 2000, 85.3% of local children attended public schools.



STATE: QUALITY OF A RESOURCE

1998 Brookline/State Education Comparisons

Indicator	Brookline	Massachusetts
Student to Teacher Ratio	15.8:1	18:1
High School Dropout Rate	0.1%	3.4%
% Of Graduates Planning to Attend 2-Year College	4.4%	18.6%
% Of Graduates Planning to Attend 4-Year College	83.4%	53.2%

Student-to-Teacher Ratio

The student to teacher ratio is an excellent indicator of the level of a community's commitment to its students. In 1998, Brookline had a student to teacher ratio of 15.8 students for every one teacher. This very low ratio indicates that Brookline is willing and capable of allocating significant resources to its students. The state ratio for the same year was 18 students for every one teacher [1].

High School Dropout Rate

Data on high school dropout rates may be used to assess the social and economic situations of adolescents and their families as well as the overall quality of the school system. The Brookline public school system had exceptionally low dropout rates of 0.4% in 1998-1999 and 0.1% in 1997-1998, suggesting very stable family, school, and community environments in addition to a high quality educational system. By comparison, the state high school dropout rate for 1998-1999 was 3.6% and for 1997-1998 was 3.4% [1].

Student Interest in Higher Education

Student interest in higher education can be used to forecast the future economic quality of life of a community's youth as well as to provide information on local perceptions of the importance of a college education. During school year 1998-1999 4.4% of Brookline high school graduates planned to attend a two-year college, while 83.4% planned to attend a four-year college. Data gathered statewide in school year 1998-1999 indicates that 20.6% of high school students planned to attend a two-year college and 52.8% planned to attend a four-year college [1].

Literacy rates

The Town of Brookline does not currently measure literacy rates. However, the Massachusetts Department of Education lists the percentage of the student population which has limited English proficiency within the district as 9.7%. Boston is 4.6%.



RESPONSE: ACTIONS THE TOWN OF BROOKLINE IS TAKING

Per-pupil Expenditures

To gauge Brookline's investment in education, a measure of the dollar amount per student in the district was determined. In school year 1998-1999, per pupil expenditures were \$8,563.00 for all day programs. The average for the state for the same year was \$6,692.00 [1].

Environmental Education Programs

Assessing the number of environmental education programs offered to a community can help gauge local interest in fostering environmental awareness and stewardship. The following environmental education programs have been in effect in Brookline since 1998 [2-4]:

- ◆ Community environmental education art project - "Visions of Green Community" (hosted its' 5th Annual Mixed Media Exhibition in 2001)
- ◆ Grades K-5 Recycling Education Programs
- ◆ "Mutt Mitt" program to encourage pet owners to pick up after their animals
- ◆ Ongoing education, art and music programs and events sponsored by the Friends of Hall's Pond, Friends of the Muddy River, and Brookline Greenspace Alliance
- ◆ Initiative to educate the community on sources of stormwater pollution, sponsored by the Conservation Commission
- ◆ Fresh Water Fair co-sponsored by Brookline, Boston, and the New England Aquarium

Environmental Curriculum in Schools

Another indicator of local interest in environmental issues is Brookline's commitment to environmental education in the curriculum of local schools. According to science curriculum coordinators, 100% of Brookline public schools include environmental education. In early education, most notable are segments devoted to pollution and solid waste life cycles in the fifth grade, water quality of local water bodies in the sixth grade, as well as an elementary education program at Hall's Pond Sanctuary. At the high school level, Brookline has semester-long courses, such as Environmental Technology 1 and 2, which provide in-depth examinations of natural systems and the relationship between humans and the environment and an Advanced Placement course on Environmental Science [5; 6].

RECOMMENDATIONS

All indicators point to the excellence of the Brookline public school system. It outscored the state of Massachusetts on many sustainability indicators. Exceptionally low dropout rates, low student-to-teacher ratios, and high dollar amounts per pupil all speak to the substantial resource base in the community and the community's commitment to quality educational opportunities.

Develop community education programs around the sustainability concept

It is obvious that Brookline values environmental education, and as Brookline's government becomes more committed to sustainable environmental, economic, and social practices it should begin to introduce the sustainability concept to its education programs. Hamilton-Wentworth, Ontario hosted a Sustainability Day that could provide Brookline with a good example to follow.

Regularly monitor the adult English literacy rate and evaluate the needs of Russian and Asian communities

Brookline does not currently evaluate its adult literacy rate and extensive research did not reveal a measure of this indicator at either the state or federal level. Brookline has a substantial number of immigrants, including sizeable Russian and Asian populations. Poor English-language skills may negatively impact their opportunities to fully function within the community or to gain employment and proper health care. Measuring adult literacy rates should help Brookline determine the extent of this problem in order to design educational programs that effectively address the issues of this segment of the population.

SOURCES

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6. Personal Communication: Victor Mellahof, 9-12 curriculum coordinator, Brookline Department of Education, March 2001.

HEALTH



Why examine HEALTH?

A sustainable community ensures that all residents are provided with the means to live a healthy life. The health of residents within a community is closely related to the quality of their social and natural environment. Direct connections can be made between a cluster of cancer cases and the prevalence of a toxin within the environment. Access to high quality health care is also a characteristic of a sustainable community. Statistics show that mental health or counseling services help reduce violent behavior in the home and on the job. Through assessment of both physical and mental health conditions within a community, more effective programs can be designed that provide long-term economic and social benefits to a town's inhabitants.

Findings of Sustainability Inventory

Summary of Data Points	Revealing Facts
What are the asthma levels in Brookline?	There are 41 reported cases of asthma in Brookline, 0.077% of population. (1998)
Are there high lead levels in children?	There was 1 case reported of high lead levels. (1999)
What is the percentage of babies born with low birth weight?	In 1999, there were 6.9% of children born under a healthy birth weight.
How many teenage pregnancies were there in Brookline?	In 1998, there were 12 births in the 10-19 year old age range. In 1999, this number dropped to less than 6 for this group.
What are the three most common types of cancer?	Breast, Prostrate, and Colo-rectal Cancers comprise the top three most common. (1997)
What percentage of students has attempted suicide?	10% of 9 th grade students have attempted suicide. (2000)
How many participants utilize the Senior Center?	Open since May of 2001, there are approximately 100-300 participants per day at the Senior Center, depending on the activity.

Recommendations

- ◆ Raise awareness about the prevalence of heart disease in the community through educational forums
- ◆ Form suicide prevention programs for Brookline teenagers
- ◆ Encourage biking and walking to school and work

Making the Sustainability Connection Through Interdepartmental Partnerships

Bike to Work day

Transportation Division, Health Department, Brookline Bicycle Coalition

Indoor Air Quality educational event

Planning & Community Development, Housing, Health Department



PRESSURE: STRESSORS ON A RESOURCE

Causes of mortality in adults and children

Currently in Brookline variants of heart disease are the most common causes of mortality in adults. In 1998, major cardiovascular disease, heart disease, and coronary heart disease were the top three causes of mortality in adults. Fortunately, there does not seem to be a common mortal threat to children in the community. In children there was only one cause of death, a lone homicide that required legal intervention [1].



STATE: QUALITY OF A RESOURCE

Asthma

The number of cases of asthma within a community can help pinpoint areas that may be under environmental stress from poor air quality. In Brookline, during 1998 there were 41 hospital discharges for asthma corresponding to 0.077% of the population [1]. This percentage is well below the national average two years before, in 1996, which was 18 percent of the population [7]. In Brookline, amongst children, 15% of males and 5% of females were diagnosed with asthma [6].

Lead Levels

Brookline does not appear to have a serious problem with elevated lead levels in children. In 1998, only 1 child had a lead level between 20 and 24ug/dL (micrograms per deciliter) and only 1 child had blood lead levels greater than 25ug/dL. In 1999, there was only one reported case of a high lead level, greater than 25ug/dL [1]. By comparison, in 1994 the national average was 2.3% of the child population according to the Center for Disease Control (CDC).

Low Birth Weight

Another important indicator of community health is the percentage of infants born with low birth weight (infants weighing less than or equal to 5.5 pounds) [7]. High percentages of children born with low birth weights can indicate the presence of environmental contaminants or identify a need for more prenatal care. In 1998, 6.6% of Brookline births were under a healthy birth weight and in 1999, 6.9% of births were of a low birth weight [1]. According to the CDC the national average of newborns with low birth weight in 1998 was 7.8%.

Teenage Pregnancies

The number of teenage pregnancies and births within a community can indicate stresses on the social system and/or a need for an increased focus on contraceptive education or distribution. In 1998 there were 12 births by adolescents aged 10-19. In 1999, the number was listed N/A denoting a number less than 6 [1]. This was considerably less than the national average according to the CDC which was, in 1998, 1 births per 1000 teenagers aged 10-14 and 51.1 per 1000 for teenagers aged 15-19. The number of pregnancies in teenagers aged 10-19 in Brookline in 1998 was 12 demonstrating that while teenage pregnancies do occur they currently are significantly below the national average [1].

Cancer

In order to assess cancer risks within the community the top three types of cancer, in both adults and children, were determined by data collected through both the cancer registry and hospitalization records. The cancer registry lists the top three types of cancer in adults in 1997 as breast cancer (in females), prostate cancer, and colo-rectal cancer and does not yet provide data for 1998. Cancer hospitalization records from 1998 list the top three types of cancer in adults as colo-rectal cancer, breast cancer (in females), and lung cancer. Records of cancer hospitalizations were the only source of information on cancer cases in children. According to these records, in 1998, the number of cancer cases reported in children was listed as "N/A" denoting a number fewer than 6 [1].

Mental Health - Attempted Suicides

One assessment of the state of mental health within a community is the number of attempted suicides. According to the Health Department's publication, "Healthy Brookline Volume IV," in the year 2000 1 in 10 (10%) of Brookline High School 9th grade students reported attempting suicide [6]. According to the Director of the Health Department, Alan Balsam, this study will be repeated in 2-3 years.



RESPONSE: ACTIONS THE TOWN OF BROOKLINE IS TAKING

Community Health Programs

The number and diversity of preventative and educational health programs within the community measure the community's commitment to educating the public about important health issues.

Brookline operates a significant number of community health programs:

- ◆
- ◆ Bicycle safety education program
- ◆ Sponsored events for Students
- ◆ Against Drunk Driving (SADD)
- ◆ Program countering bullying
- ◆ Dating violence intervention program
- ◆ AIDS peer leadership program
- ◆ Eating disorders program
- ◆
- ◆
- ◆ Hepatitis B immunization
- ◆ Dental Literary Project (w/ Tufts)
- ◆ Elder Health Program
- ◆ Town's Domestic Violence Roundtable
- ◆ Health Education/Cultural Series for Russian Speaking citizens
- ◆ Co-sponsored Mercury Thermometer Exchange program

According to the Town of Brookline website the following programs are currently run by the health department in town:

- ◆ Smokefree Brookline
- ◆ Child Health Program
- ◆ Depression Screening Day
- ◆ Rabies Immunization Clinic
- ◆ Choke saver classes
- ◆ Child and Adult Immunizations
- ◆ Lead screening for children
- ◆ TB screening clinic
- ◆ Blood Pressure Program
- ◆ Flu Clinics
- ◆ Yoga classes
- ◆ Dental Clinic
- ◆ Memory screening day
- ◆ Mammograms
- ◆ Alcoholics Anonymous
- ◆ Bartending training classes

RECOMMENDATIONS

Brookline fared very well on the health quality indicators of this inventory. It is significantly below national averages in asthma rates, lead levels in children, low birth weights, and teen pregnancy and birth rates. Additionally, it offers a wide range of health programs indicating a substantial interest in prevention through community education on serious health issues. Brookline stands out as a community that cares about the health and welfare of its inhabitants and responds to community health issues. Brookline can continue to work towards its goal of sustainability through periodic evaluation of these health indicators, as well as the possible addition of new indicators, such as records of HIV+ individuals or numbers of persons taking anti-depressant medications. This will allow Brookline to stay abreast of significant health problems within the community and ensure that the current level of health in the community is sustained and improved in the long term.

Reduce Heart Disease through preventative education

Heart disease is prevalent within Brookline. Variants of heart disease make up the three most common causes of mortality in Brookline. While successfully modifying individual lifestyles is a daunting task, the town should consider increasing its programming and education efforts that focus on exercise and healthy eating habits for both children and adults within the community.

Reduce the number of attempted suicides among High School students through counseling

There is a high rate of attempted suicides among ninth graders in Brookline High School. One in ten ninth graders at Brookline High report having attempted suicide. This is a staggering statistic that serves as an indicator of the impact that complex social issues can have on adolescents. Brookline currently has an excellent record of addressing a leading cause of adolescent suicide through programs that focus on issues of the gay and lesbian student community. It may want to consider complementing these programs with continued and increased attention to domestic and family issues and the adequacy of counseling opportunities within the community. The town has already taken a significant step toward understanding the full extent of this problem through its decision to periodically complete a Youth Risk Behavior Survey. The town may want to design a more comprehensive study that provides additional insight into the direct causes of elevated levels of attempted suicide rates within its adolescent community as well as collecting data on similar statistics in adults. Likewise, the town may consider publicizing these statistics and increase counseling services in the high school.

Support the Brookline Health Department

All departments should support the Health Department in its efforts to provide education and resources to residents. For example, the Mercury Thermometer Exchange Day that took place in October 2001 was a joint effort involving the Department of Public Works, the Health Department, Brookline Conservation Commission, and the Solid Waste Advisory Committee. This event helped to educate residents on the hazards of mercury, as well as eliminate these potentially harmful materials from Brookline households.

SOURCES

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2. Town of Brookline Department of Health, <http://www.town.brookline.ma.us/Health>, February 10, 2001.
3. Brookline Annual Report 1998, Town of Brookline.
4. Brookline Annual Report 1999, Town of Brookline.
5. Personal communication, Lynn Carsten, Community Health Dept., Town of Brookline, March 5, 2001
6. Healthy Brookline Vol. IV: Youth Risk Behavior Survey, Brookline Department of Public Health, 2000.
7. Centers for Disease Control, <http://www.cdc.gov>, March 2001.
8. Rosenberg, H.M., Ventura, S.J., Maurer, J.D., Heuser, R.L., and M.A. Freedman. "Births and Deaths: United States, 1995." Monthly Vital Statistics Report. Vol. 45, No. 3 (Supplement 2).

HOUSING



Why examine HOUSING?

Housing is a fundamental need for every citizen. Housing needs to be available for diverse members of a community, including elderly persons on a fixed income, young families starting out, and those earning low hourly wages. Citizens who cope with unstable housing conditions suffer stress that they may bring into the workplace or school setting. Accurately measuring the degree to which housing needs are met will enable a community to design and implement programs to successfully address housing needs at every income level.

Findings of Sustainability Inventory

Summary of Data Points	Revealing Facts
How many households are on the waiting list for federally assisted living?	Thelma Williams, Applications Manager at the Brookline Housing Authority, reports that 452 families are on the waiting list for federally assisted living in Brookline as of April 2001.
What is the average house price to median income?	According to the Brookline Housing Advisory Board's "Update on Affordable Housing" May 2000, Condominiums are the most affordable form of home ownership in Brookline. The average condo price between 1998-1999 has increased 16%, from \$210,000 to \$243,000. In relation, the income requirement has increased from \$75,000 to \$86,000.
What is the average monthly rent versus median monthly salary?	According to the Brookline Housing Advisory Board's "Update on Affordable Housing" May 2000, the average monthly rent for a 2 bedroom apartment ranges from \$1600 to \$2800. This sets the combined household income for individuals seeking rentals at \$64,000 to \$112,000 (This range applies the standard ratio of 30% of income budgeted for housing costs).
What percentage of households pays more than 30% of their income on housing?	40% of households pay greater than 30% of their total income on housing.
What percentage of Brookline's housing is affordable?	According to the Brookline Housing Advisory Board's "Update on Affordable Housing" May 2000, housing units in 1990 totaled 25,219; 7.7% of these units were categorized as "affordable."
What is Brookline's ratio of homeowners to renters?	According to Census 2000, there are 25,594 occupied housing units in Brookline, 11,583 of which are occupied by owners and 14,011 occupied by renters.

Recommendations

- ◆ Develop Green Building Codes
- ◆ Increase quantity of Affordable Housing
- ◆ Encourage new affordable housing units to be built with recycled materials

Making the Sustainability Connection Through Interdepartmental Partnerships

Provide Incentives for “Green Building”	Housing, Conservation, Planning & Community Development, Economic Development
Provide more affordable housing	Housing, Planning & Community Development, Economic Development
Locate affordable housing in developed areas close to alternative transportation	Housing, Planning & Community Development, Economic Development, Transportation Division



PRESSURE: STRESSORS ON A RESOURCE

Number of residents seeking federally assisted living

In order to judge whether Brookline supports and promotes social and economic diversity, it is helpful to determine the availability of affordable housing. This can be established by noting the number of households seeking federally assisted living. As of April 2001, there are 452 families on the waiting list for federal aid with the Brookline Housing Authority [1].



STATE: QUALITY OF A RESOURCE

Average house price to median income

Determining the median house price to median income serves to indicate to what degree home ownership is affordable for citizens currently dwelling in Brookline. According to the Brookline Housing Advisory Board’s “Update on Affordable Housing” May 2000, Condominiums are the most affordable form of home ownership in Brookline. The average condominium price between 1998-1999 has increased 16%, from \$210,000 to \$243,000. In relation, the income requirement has increased from \$75,000 to \$86,000 (2).

Average monthly rent versus median monthly salary

Comparing the average monthly rent to the average monthly salary indicates the affordability of rental housing. The average monthly rent for a 2-bedroom apartment ranges from \$1,600 to \$2,800. This sets the combined household income for individuals seeking rentals at \$64,000 to \$112,000 (This range applies the standard ratio of 30% of income budgeted for housing costs) [2].

Percentage of households paying more than 30% of their income on housing

To assess the cost of housing in comparison to the cost of living it is helpful to determine the percentage of households that pay more than 30% of their income on housing. In the opinion of Francine Price, Housing Development Officer, Brookline Dept. of Planning and Community Development, most of Brookline's citizens pay as much as 40% of their income on housing [4]. According to a local agent, typical rentals for two-bedroom apartments that become vacant now range from \$1,600 to \$2,800 and as a result, the combined salary for a typical buyer of a typical property has increased from \$75,000 to \$86,000 a year.

Ratio of homeowners to renters

Examining the ratio of the number of homeowners to the number of renters provides a measure of transience within the community. By 1990, the percentage of renters was 43% while the total percentage of homeowners was 57%, a proportion that appears to be remaining constant [5]. According to Census 2000, there are 26,413 housing units in Brookline, 11,583 of which are owner occupied, 14,011 renter occupied, and the remaining 819 are vacant.

Green design principles

Utilizing renewable resources is essential to ecological sustainability. Recording what percentage of housing units existing in the community were built to date using renewable resources and green design principles establishes a point of reference for monitoring and encouraging the use of renewables in home construction. At present, this figure is less than 1% [6]. Notably, in 1983 Boston Edison commissioned Solar Design Associates to design and construct the Photovoltaic (PV)-powered 'Impact 2000' House in Brookline as a demonstration of future trends in environmental design. Photovoltaic is a semiconductor technology that silently converts light energy into direct-current (dc) electricity. This process does not require moving parts or fuel burning, and does not create pollution [7].

Allocation of affordable housing

To ensure that all housing does not get priced beyond those of low to moderate income, the elderly, students, and those on welfare, it is important that a suitable number of regulated affordable units be created each year by Town programming. An affordable unit is one that is financed with the intent to reduce occupancy costs. The goal is for typical residents of affordable housing to pay no more than approximately 30% of their income on gross housing costs. Brookline currently has 1810 affordable housing units. Not included in this figure are about 120 households, which were renting privately owned apartments with the aid of federal section 8 certificates administered by the Brookline Housing Authority. The Brookline Housing Authority (BHA) owns and operates the largest category of affordable housing, which is governed by an independent public board. The BHA currently administers 921 units, which are subsidized by either the State or Federal government. The future inventory of affordable housing could decrease to 5% of all units within the next 20 years due to the current pace of affordable housing development [8].



RESPONSE: ACTIONS THE LOCAL GOVERNMENT ARE TAKING

Brookline, like many communities in the Boston area, is facing a serious housing shortage and an ever-increasing cost of housing. Brookline's Housing Authority and the Department of Planning and Community Development recognize the problem and are currently taking steps to meet the challenge [2]. In its Update

on Affordable Housing prepared for the Brookline Board of Selectmen for the 2000 Annual Town Meeting, the Brookline Advisory Board highlighted initiatives that have already been set in motion. In its report the board states that the Housing Advisory Board and housing staff are more committed than ever to preserving the economic diversity, which has contributed to Brookline's vibrancy as a community.

In 1999, the Housing Advisory Board proposed a set of guidelines for developers of rental and condominium housing subject to Section 4.40 of the Zoning By-law "inclusionary zoning," which the Planning Board adopted in December of 1999. This has standardized certain requirements, making them more predictable for developers considering new projects. In 1999, the HAB completed a review of current Town housing policies and programs and is in the process of proposing changes in priorities and program design. In its report, the HAB says it will be working in 2001 to evaluate the Town's Zoning By-law with regard to appropriate incentives for effectiveness in encouraging the development of affordable housing, and expects to recommend changes. It also plans to review the benefits of comprehensive permitting.

In a climate made difficult by a strong economy the HAB is doing an exceptional job of attending to the needs of Brookline's less affluent citizens. The shortage of affordable housing is not easily remedied and any solution will require much diligence and cooperation.

RECOMMENDATIONS

Develop 'Green' building codes

In the interest of achieving social as well as environmental sustainability it is important that Brookline take steps to incorporate environmental concepts and green design into its programs and planning. The notion of green design describes any design or architecture, which strives to minimize negative environmental impacts and optimize energy efficiency and general sustainability. Green building materials are non-toxic and often made of recycled goods. Roofing materials, floor finish, and linoleum are just a few of the green building products now readily available and frequently competitively priced. Home Depot offers an extensive list of environmentally friendly products such as cellulose insulation made with post-consumer recycled paper, low-flush toilets, and automatic light sensors, which turn on and off with the sun.

While Brookline is actively looking for new ways to increase its inventory of affordable housing it would profit from considering an increase in the use of green design principles in all renovations and new constructions. Inclusionary zoning could be taken a step further to include a green building component. Building codes could mandate the use of energy and water efficient devices, and promote planting with native landscaping. Brookline could look at Green Building Code examples from communities such as Austin, Texas; Oakland, California; and San Francisco, California. To promote the adoption of green design by private and public contractors a tax credit could be given to those who employ environmentally friendly building materials and/or designs geared to maximizing energy efficiency. Individuals who purchase houses built with green design principles or upgrade conventional homes to become more environmentally sound could be granted a reduction in their real estate taxes. To further promote an interest in sustainable building practices the town could establish an award for 'home greening' to be awarded annually to a family or individual who takes the greatest step towards making their home more environmentally friendly.

Encourage all affordable housing to be energy efficient, built using recycled materials, and equipped with water conservation devices

Brookline has a fund to promote affordable housing for its inhabitants. In terms of Brookline's interest in achieving the status of a sustainable community, the two most important issues concerning housing are the

MUNICIPAL ACTIVITIES



Why examine MUNICIPAL ACTIVITIES?

A municipality needs to lead the way towards a sustainable future, so that others can follow. Achieving sustainability goals may require modifying ordinances to establish an enabling environment for citizens to practice sustainability. By allocating appropriate financial and personnel resources, Brookline increases the possibility of achieving the goals of a more sustainable community. Through identification of the amount of money budgeted for “environmentally-friendly” goods, for example, goods that are recycled, reused, or energy efficient, the town can assess how effectively it is practicing sustainable behavior and determine how to improve its performance in the future. Brookline provides its residents with a variety of recreational opportunities that benefit all ages and abilities, impacting quality of life and creating a strong sense of community.

Findings of Sustainability Inventory

Summary of Data Points	Revealing Facts
What percentage of the budget is devoted to environmental departments, or what is the number of staff involved in environmental management?	There are three full-time staff members involved with environmental management in Brookline (Director of Parks and Open Space, Conservation Administrator, and Conservation Assistant).
Does Brookline have an Environmental or Sustainability Mission Statement?	Yes, “To preserve and protect the town’s environment through administration of mandated federal, state, and town laws and regulations.”
What percentage of items bought by the municipality are “environmentally friendly” e.g. recycled paper, re-used furniture, energy-efficient lighting?	1998 Statistics: In 1999, 5% of the budget allocated for office supplies was spent on Environmentally friendly goods (\$70,000-\$80,000).

Recommendations

- ◆ Monitor attendance and community receptiveness to the Senior Center
- ◆ Educate residents and become a role model for the community
- ◆ Continue to purchase “environmentally friendly” goods, and set goals for a higher purchase percentage

Making the Sustainability Connection Through Interdepartmental Partnerships

Incorporate green practices into daily routines

All municipal departments

Increase purchase of “environmentally friendly” items
Economic Development, Conservation

Purchasing Department, School Department,



PRESSURE: STRESSORS ON A RESOURCE

Budget Restraints

The level of involvement of local government in sustainability efforts is based on the resources that are available. The budgets allotted to environmental departments, time, and education are a few of the many factors that increase the overall effectiveness of municipal involvement. The most significant pressure on increasing green practices within municipal activities is budgetary constraints. Money must be made available to purchase environmentally friendly goods and to increase the number of municipal employees involved with environmental issues within the town. Many “green” products tend to have a higher up-front cost, but provide long-term benefits both for the environment and financially.



STATE: QUALITY OF A RESOURCE

Staff involved in environmental management

The Town of Brookline has demonstrated a commitment to its natural resources through the number of people involved in the management of these areas. Brookline currently employs four people that are responsible, in part, for environmental management and planning. They include, the Parks and Open Space Director, Conservation Administrator, Conservation Assistant, as well as the Planning and Community Development Director. An additional 49 full time and seasonal people work for the Park and Open Space Division of the Department of Public Works. As sustainability encompasses social and economic as well as environmental concerns, a fully sustainable community addresses and implements sustainable behavior within all municipal departments.

Outside sources incorporated into environmental management

In addition to municipal departments that are responsible for environmental management, Brookline maintains a strong partnership with area universities. Student interns provide a great deal of information for research projects within the town regarding environmental issues mapping information services and planning. A recent project involves the drafting of a Climate Action Plan for Brookline.

Programs for the elderly

Brookline’s population contains a significant number of elderly residents. According to Census 2000, 12.4% of the total population is over 65 years of age. It is important for Brookline to provide adequate housing, health care, and opportunities for leisure activities to this age group. In May of 2001, a newly constructed Senior Center opened in Brookline that provides activities for the elderly.



RESPONSE: ACTIONS THE TOWN OF BROOKLINE IS TAKING

Environmentally friendly purchasing practices

In 1998, Brookline spent approximately \$70,000 - \$80,000 on “environmentally friendly” goods. The primary goods purchased were recycled paper goods, recycled toner cartridges for printers, recycled books, and energy efficient light fixtures. Brookline anticipates increasing their expenditure on “environmentally friendly” items as they become more available. In 1999, Brookline spent five percent of their total general supply expenditures, which amounted to approximately \$125,000, on “environmenta

RECOMMENDATIONS

Brookline has been effective in demonstrating increased concern for the natural environment. The town is continually improving or initiating environmental programs and activities. Additionally, Brookline has steadily raised the number of green and environmentally friendly products purchased overall for the town. The town has implemented a Park Ranger Program, hired seasonal nature sanctuary interns, and completed both a Climate Change Emissions Inventory, Local Action Plan on Climate Change, and Community Sustainability Inventory.

Cooperation among departments

Brookline should seek ways in which every employee can realize the role that he/she plays in building a sustainable community. The concepts of sustainability must transcend to all municipal departments, not only those who are traditionally involved with environmental management or socio-economic programs. Examples of small changes that could have large positive impacts include double-siding all documents and copies and turning off computer monitors when they are not being used for extended periods of time.

Continue to purchase “environmentally friendly” items

Brookline has shown its commitment to purchasing “environmentally friendly” items and should continue to do so. It is recommended that Brookline set a goal for each fiscal year on the percentage of “environmentally friendly” items purchased by the town and continually increase it, until all goods that can be, have been replaced with more sustainable and efficient goods. This can be accomplished through inserting energy efficient requirements into procurement policies for all departments of the municipal government. Brookline could benefit from looking at eco-procurement policies set by Seattle and Santa Monica for suggestions on how to increase the percentage of environmentally friendly items. Likewise, Brookline could better utilize state funded programs such as “Environmentally Preferred Products.”

Educate residents

The initiatives taken on by the municipal government should be seen as a model for the community. The local government should educate the community on the actions and commitments it has undertaken related to sustainable practices and management. To be effective, the town should initiate community outreach regarding “environmentally friendly” products and provide incentives through tax breaks or rewards to encourage the community as a whole to purchase Energy Star or equivalently rated products. Additionally, Brookline could work with the manufacturers of these more efficient products to alleviate initial costs if a certain percentage of the community purchases these appliances for their homes and/or businesses.

SOURCES

1. Personal Communication: Erin Chute, Director of Parks and Open Space, Town of Brookline, MA.
2. Personal Communication: David Geanakakis, Chief Procurement Officer, Town of Brookline, MA.

SAFETY



Why examine SAFETY?

Safety is a major concern for any community. Measurements of the number and type of crime allow for the development of goals for crime reduction as well as the evaluation of crime prevention programs. In addition, community confidence in and comfort with public safety officials promotes healthy neighborhood interaction, which may serve to benefit local businesses, encourage beautification measures, and improve community health. A community may then evolve into a place of life rather than merely just a place to live.

Findings of Sustainability Inventory

Summary of Data Points	Revealing Facts
What is the total number of recorded crimes in Brookline?	There were 1716 reported crimes in 1998.
How many Domestic Violence arrests were made by the Police Department?	In 1998, there were 114 arrests.
What percent of the community feels safe?	According to 1998 statistics, 94.87% of the population feels safe in Brookline.
How many Community Public Safety programs exist?	In 2001, 9 safety programs were initiated.
What is the number of public safety officials (police and fire) per community member?	According to the Brookline Police Department Web Page, there is currently 1 public safety official (police and fire) for every 186 people in Brookline.

Recommendations

- ◆ Continue to teach tolerance
- ◆ Increase bike patrols

Making the Sustainability Connection: Partner With Other Departments to Advance Community Goals

Increase tolerance of the diversity in Brookline

School, Police Department, Health Department, Information Technology

Increase community outreach on public safety programs

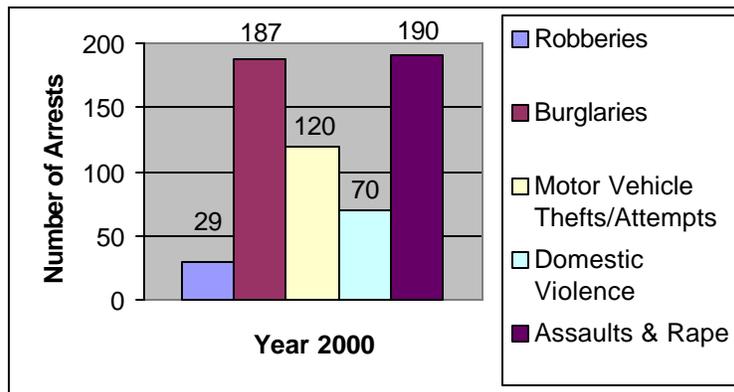
Police Department, Information Technology, School Department, Library



PRESSURE: STRESSORS ON A RESOURCE

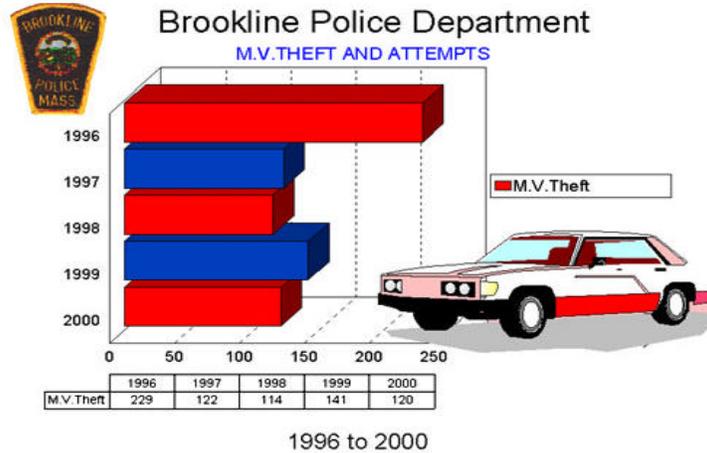
Crime Statistics

According to the Brookline Police Department Website, the approximate number of “Part A Crimes” for the year 2000 were as follows: 190 assaults & rape arrests, 187 burglaries, 619 larceny/thefts, 120 motor vehicle theft/attempts, and 29 robberies [3].



Year 2000 data indicates that Brookline experienced 263 less Part A Crimes in relation to 1999 statistics. During this time, the Department had a 19% decrease in robberies, but a 33% increase in burglaries. Robberies are classified as a theft of money or property of a person by force or threat of force, whereby burglary is the theft from a house, building, or vehicle (not a person). Larceny/theft numbers decreased by 31%, and motor vehicle thefts saw a 14.9% decrease [3].

In 1999, motor vehicle thefts represented the largest increase in crime in Brookline. In 2000, this number dropped 14.9%. The following chart summarizes the number of motor vehicle thefts in Brookline from 1996 to 2000.



Source: <http://www.brooklinepolice.com>

Domestic Violence

The Brookline Police Department’s website indicates 114 domestic violence arrests occurred in 1998. That number increased by one in 1999, but decreased to 70 in the year 2000 [3]. In a conversation with Officer O’Reardon of the Brookline Police Department, he indicated that gang-related crimes are not typical, but isolated events. There were no gang-related arrests in 1998 [4].



STATE: QUALITY OF A RESOURCE

Confidence in Public Safety

A sense of security within a community is critical to achieving a sustainable community and maintaining a high quality of life. According to the 1998 town census, 94.87% of 9,000 households surveyed indicated a favorable response to current public safety [1].



RESPONSE: ACTIONS THE TOWN OF BROOKLINE IS TAKING

Crime Prevention Programs

Public safety and crime prevention is best achieved through community education. Town sponsored programs and community safety organizations are excellent ways to educate because they promote active citizen involvement in the community. In 1998, Brookline supported nine community organizations associated with community safety and well-being. The following is a list of safety programs in Brookline [1]:

- ◆ D.A.R.E. (Student Drug Prevention Program)
- ◆ Brookline Evening Surveillance Team (checks on criminal offenders on probation)
- ◆ School Bus Safety Initiative
- ◆ Rape Aggression Defense classes
- ◆ Operation Conehead (encourages youth to wear bike helmets)

- ◆ Neighborhood Crime Watch
- ◆ Diversionary Program (an alternative to court for first time youth offenders)
- ◆ Walk & Talk Program
- ◆ Alert Program (provides information on how to protect valuables in cars)

Number of Police per community member

A high number of public safety personnel indicates the effective use of police department resources and ensures the community a strong commitment to public safety. There is currently one public safety official (police and fire) per every 186 people in Brookline [3].

RECOMMENDATIONS

In recent years, Brookline realized the best way to create a sense of public safety was through police visibility. The town has adopted Community Policing as a philosophy and a strategy for action [1]. This program serves to advise the Chief of Police, as well as over 10 Neighborhood Watch Associations by providing them information regarding crime in their neighborhoods. In 1998 alone, over 2000 Community Policing contacts were established. These efforts are not only used to prevent crime, but to improve quality of life and to acquaint officers with the community they are protecting [1]. It is highly recommended that Brookline maintain and increase this effort where possible.

Continue to teach tolerance

One area that has not been addressed on a wide scale is the issue of hate crimes. Brookline may want to consider conducting educational programs, particularly in the school system, regarding the issue of intolerance. For example, many teen suicide attempts (refer to Health Section of this report) are related to homosexual issues, such as the fear of alienation from family and friends. Also, an educational program to encourage tolerance of those of different backgrounds, faiths, and races is essential in a diverse community such as Brookline.

Increase bike patrols

Brookline currently has six police officers certified for bike patrol [4]. The town should consider increasing this number for both environmental and social reasons. Riding a bike around town is a much cleaner mode of transportation than a car, but just as important is the intimacy created by being able to regularly interact with town citizens on the street. Police on bike patrol are more accessible and easier to approach. They can easily assist someone through a crosswalk, diffuse an escalating parking altercation, or even join in a game of stickball with local youth, reinforcing the relationship between policeman/woman and the community.

SOURCES

1. "Brookline Annual Report 1998", Town of Brookline.
2. "Brookline Annual Report 1999", Town of Brookline.
3. Brookline Police Department website, <http://www.brooklinepolice.com>.
4. Personal communication: Officer Jim Reardon, Brookline Police Department, April 2001.

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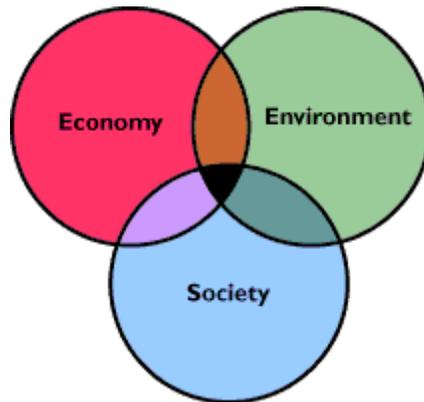
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