



Lowell will strive to bolster its growing reputation as a model for environmentally sustainable practices in an urban setting. It will accomplish this goal by proactively preparing for and adapting to climate change and continuing efforts to reduce its emissions of greenhouse gases so as to mitigate its impact on the environment.

ENVIRONMENTAL RESILIENCE

RESILIENCIA AMBIENTAL

Lowell buscará fortalecer su creciente reputación como modelo en cuanto a la implementación de practicas ambientalmente sostenibles en un puesto urbano. Logrará proactivamente su meta preparándose para y adaptándose al cambio climático y continuando sus esfuerzos de reducir las emisiones de gases de efecto invernadero para mitigar su impacto en el medioambiente.

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RESILIÊNCIA AMBIENTAL

Lowell continuará a reforçar a sua reputação crescente como modelo de práticas ambientais sustentáveis num espaço urbano. Este objectivo será atingido através de se preparar e adaptar continuamente às alterações climáticas e continuar os seus esforços em reduzir as emissões de gases de efeito estufa, a fim de minimizar seu impacto sobre o meio ambiente.

OBJECTIVES

- 1** The City of Lowell will set an example by prioritizing environmentally sustainable policies and practices.
- 2** Develop policies and programs that will build upon the successes of reducing solid waste and increasing recycling citywide.
- 3** Develop programs and policies to reduce the disposal of organic wastes into the waste stream.
- 4** Improve water quality.
- 5** Improve air quality and reduce carbon emissions through energy efficiency enhancements and the adoption of alternative fuels.
- 6** Promote urban forestry as a method for improving public health as well as the physical and built environment.
- 7** Produce energy from renewable sources.
- 8** Seek to reduce the adverse impacts and severity of flood events.
- 9** Prepare proactively for heat waves, droughts, ice storms, and other types of natural disasters so as to mitigate their negative impacts.
- 10** Educate the public about the importance and urgency of climate change and carbon emission reduction.



1

THE CITY OF LOWELL WILL SET AN EXAMPLE BY PRIORITIZING ENVIRONMENTALLY SUSTAINABLE POLICIES AND PRACTICES.

- ❑ Prioritize use of materials made from recycled content for construction and rehabilitation of city buildings and structures, and in procurement of goods and supplies.
- ❑ Build upon maintenance practices conducted at Tyler Park and expand an organic lawn care policy to other green spaces in the City, where feasible.
- ❑ Develop landscape guidelines that identify native species and ensure appropriate placement and planting standards be employed in all public projects.
- ❑ Develop snow plowing and deicing policies for roads, parking lots and pathways to minimize the use of salt and other caustic materials. Strategies may include the development of maps to identify where salt may be used and to help monitor levels of use.
- ❑ Maintain Green Community status through the Department of Energy Resources to demonstrate the City's commitment to energy efficiency and renewable energy, as well as to state grants associated with this program.
- ❑ Monitor the performance of the recent energy conservation measures implemented under the City's energy services contract, adjusting operations and practices as needed to ensure that anticipated energy reduction targets are met while providing adequate funding and training resources to ensure proper maintenance of equipment and systems.
- ❑ Continue requiring all capital building projects assisted with Consolidated Plan funding to be Energy Star certified, LEED (Leadership in Energy and Environmental Design) certifiable, or demonstrate comparable comprehensive environmental sustainability if no independent rating system is available for the specific building type.

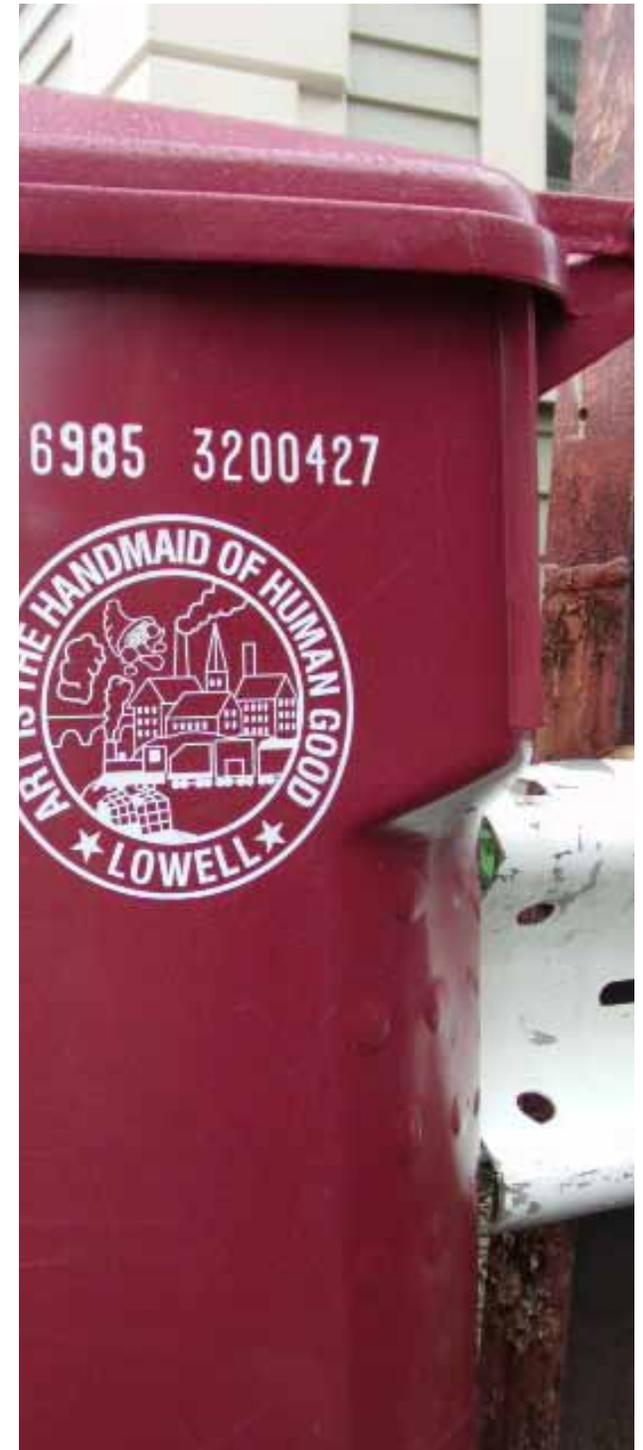
Rain Garden at Lowell High School

Photo: DPD

2

DEVELOP POLICIES AND PROGRAMS THAT WILL BUILD UPON THE SUCCESSES OF REDUCING SOLID WASTE AND INCREASING RECYCLING CITYWIDE.

- Update solid waste and recycling ordinances so as to expand access to and participation in recycling by all residential and commercial properties in the city.
- Expand on recent demonstration drop-off center projects with a permanent facility that allows for regular access to recycling and a convenient means by which to dispose of hazardous materials.
- Explore additional incentives and enforcement tools as well as more comprehensive changes, such as a potential transition to single-stream recycling, in an effort to improve the City's recycling rate.
- Explore potential partnerships with UMass Lowell, MCC and other institutional stakeholders to allow for the integration of waste stream management systems in an effort to reduce their overall waste generation.
- Increase the number of public recycling bins and solar trash compactors available Downtown and near parks, schools, public transportation, and neighborhood business districts, exploring contracts with companies that offer advertiser-funded collection options.
- Implement a recycling program in the schools.
- Expand outreach and education around recycling, composting, and proper waste disposal.
- Improve diversion of reusable materials such as clothing, furnishings, and household goods from municipal solid waste through donation, public drop boxes, institutional reuse, and other code-compliant means.
- Implement diversion and recycling policies for construction and demolition material.



Trash bins in Lowell Photo: Ben Hill



Composting bin

3 DEVELOP PROGRAMS AND POLICIES TO REDUCE THE DISPOSAL OF ORGANIC WASTES INTO THE WASTE STREAM.

- ❑ Prioritize enforcement and implementation of the City's existing ordinance for dog waste.
- ❑ Implement a food waste program that works in tandem with the recycling program.
- ❑ Support the establishment and expansion of composting programs for schools and other municipal facilities that serve food, restaurants, institutions, commercial cafeterias, and residences citywide.
- ❑ Develop a composting program for all organic waste generated while maintaining public parks.
- ❑ Process trees that have been cut down and use the wood chips produced in public parks and gardens.
- ❑ Encourage generators of waste oils, fats and greases to recycle these products into fuel and link them to businesses which harvest these materials for fuel production.
- ❑ Establish an anaerobic digester, a system used to create energy from microorganisms breaking down biodegradable material in the absence of oxygen and process organic waste from households, businesses, and local institutions.
- ❑ Encourage local businesses to become certified through the Green Business Program.



Vermicomposting workshop at the Franklin Court Community Garden

Photo: DPD

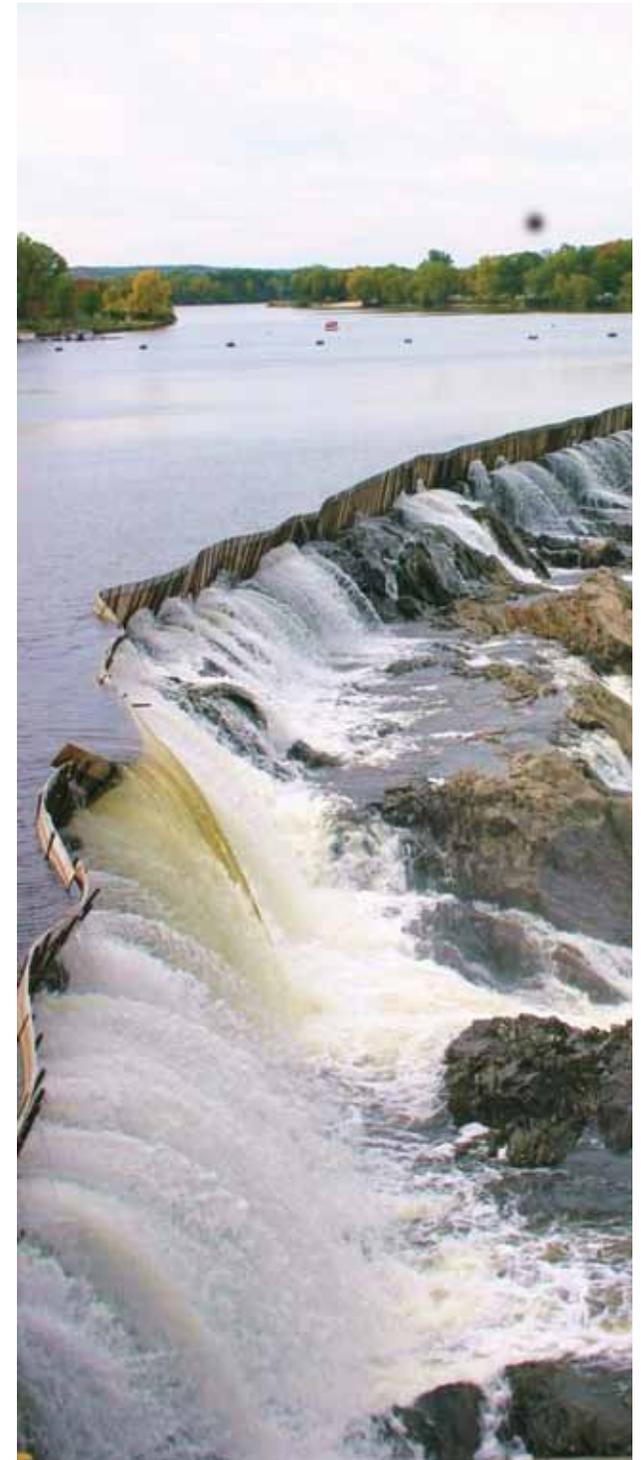
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4 IMPROVE WATER QUALITY.

- ❑ Continue to support local water quality advocates.
- ❑ Identify volunteers to assist with frequent water sample collection and processing.
- ❑ Develop and implement an agreement to keep the canals clean.
- ❑ Continue to support facility improvements at the Water and Waste Water Department.
- ❑ Reduce non-point source pollution for waterways.
- ❑ Encourage companies that produce or manage hazardous waste to locate their businesses away from the waterfront so as to discourage the pollution of waterways.
- ❑ Monitor and maintain appropriate levels of fluoridation in water supplies to protect the dental health of drinking water consumers.
- ❑ Expand public awareness and alternative disposal programs to eliminate pharmaceutical disposal into the wastewater system.



Volunteers cleaning the Eastern Canal
Photo: Canalwater Cleaners



Pawtucket Falls Dam
Photo: Jennifer Myers



5 IMPROVE AIR QUALITY AND REDUCE CARBON EMISSIONS THROUGH ENERGY EFFICIENCY ENHANCEMENTS AND THE ADOPTION OF ALTERNATIVE FUELS.

- ❑ Incorporate the purchase of more electric vehicles in the City vehicle purchasing policy and plan for the placement of charging facilities to support an electric vehicle fleet.
- ❑ Install publicly accessible electric vehicle charging stations in places such as public parking garages and public parks, and implement parking incentives for electric vehicles in municipal garages.
- ❑ Develop a streamlined permit process to support the installation of home-based electric vehicle charging stations.
- ❑ Require licensed taxi companies and operators in Lowell to convert their fleets to fuel-efficient or hybrid vehicles.
- ❑ Petition the Massachusetts Department of Public Utilities for a municipal electricity aggregation program, whereby municipalities would combine the purchasing power of individual consumers to secure competitive energy supply contracts to lower the total electricity costs for ratepayers, and utilize the resultant access to ratepayer funds to develop and implement a municipal program for promoting energy efficiency retrofitting of residential and commercial buildings citywide.
- ❑ Reduce the carbon emissions from residential, institutional, industrial, and commercial buildings citywide 20% by 2025.
- ❑ Support UMass Lowell in their goal of reaching climate neutrality by 2050, and seek to work collaboratively in achieving this goal wherever practical.

Public electric vehicle charging station in Lowell.

Photo: DPD

6 PROMOTE URBAN FORESTRY AS A METHOD FOR IMPROVING PUBLIC HEALTH AS WELL AS THE PHYSICAL AND BUILT ENVIRONMENT.

- ❑ Plant a minimum of 3,000 new trees throughout the city by 2025, prioritizing street tree planting, particularly in areas where there is a shortage.
- ❑ Conduct a citywide tree inventory, potentially utilizing smartphone applications or similar technologies, and perform regular updates.
- ❑ Update the existing tree ordinance and prioritize implementation to ensure that, whenever possible, public trees are replaced when they are removed.
- ❑ Improve coordination between city departments on tree planting procedures.
- ❑ Ensure that appropriate City officials are properly trained to act as stewards of the City's public trees in a manner consistent with the tree ordinance.
- ❑ Promote the partnerships that provide free trees to first-time home buyers.
- ❑ Encourage the planting of urban orchards, where appropriate.
- ❑ Explore the feasibility of establishing an urban tree farm or nursery.



Seattle plans to build the largest urban food forest in the U.S.
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Photo: Harrison Design



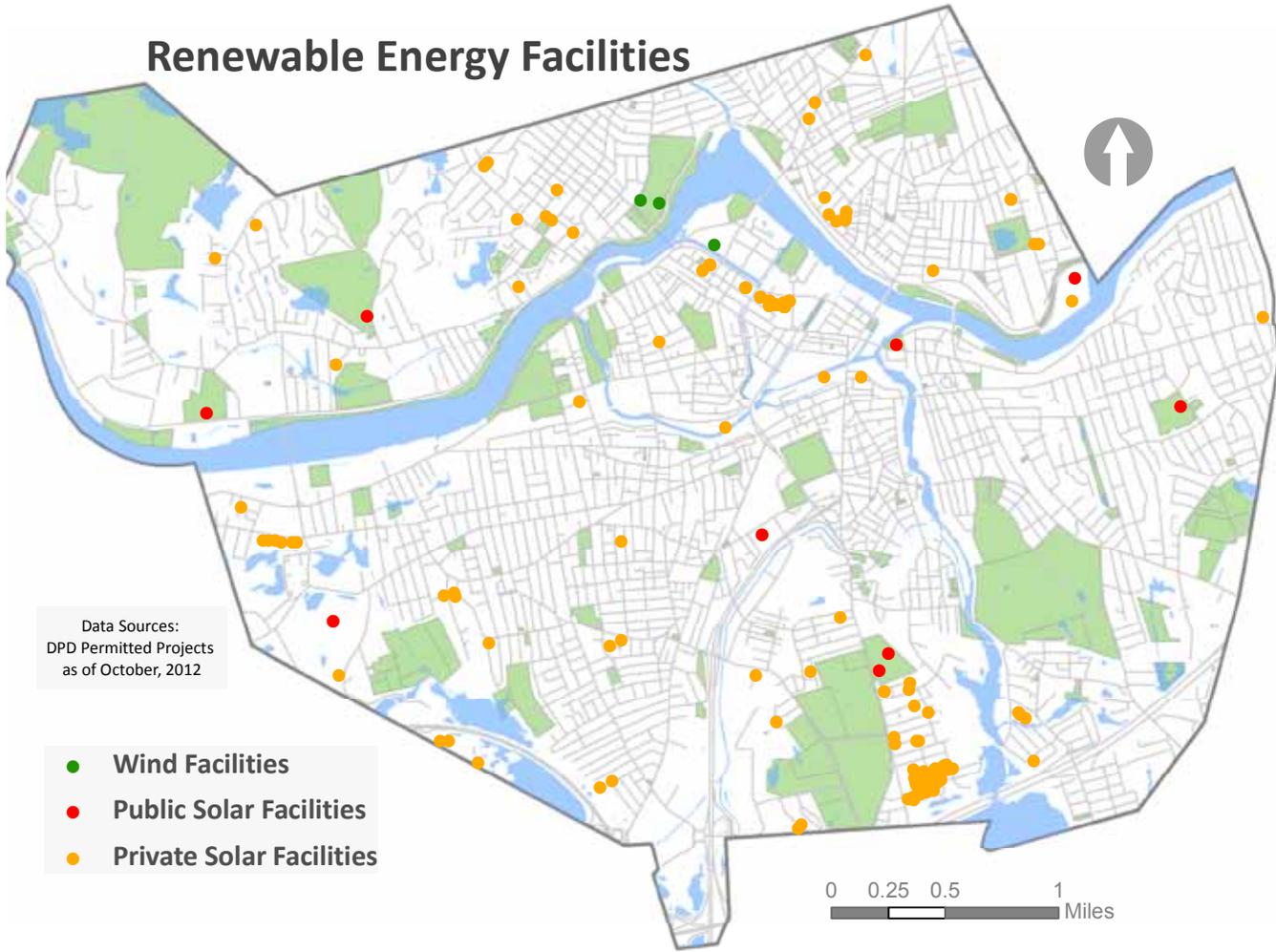


7 PRODUCE ENERGY FROM RENEWABLE SOURCES.

- ☐ Identify the impediments to implementation of renewable energy systems on private homes and commercial properties, and seek to address them through education, permit streamlining, and ordinances which properly balance incentives with regulation of potentially harmful impacts.
- ☐ Develop brightfields and other large scale renewable energy facilities, particularly in areas that will spur urban revitalization, aid in toxic waste site cleanup, or where environmental conditions limit alternative redevelopment options, including the Westford Street landfill and Silresim Superfund Site.
- ☐ Identify and prioritize installation of solar photovoltaic arrays and other renewable energy systems on municipal property, including but not limited to parking garages, schools, and parks.
- ☐ Identify and assess opportunities for implementing solar thermal arrays on or near municipal facilities, including public pools or spray parks.
- ☐ Improve education and connect interested parties in Lowell to financial incentive programs to encourage deployment of renewable energy facilities.
- ☐ Encourage adoption and market transformation of renewable energy technologies.
- ☐ Support the continued use of Lowell's historic Downtown canal system for utility-scale hydroelectric power generation, while working to ensure that the owners of these facilities act as responsible stewards and collaborative partners with their neighbors, the City, and other stakeholders.
- ☐ Explore use of geothermal, cogeneration, and storage technologies.

Photo: CBA

Renewable Energy Facilities



Data Sources:
DPD Permitted Projects
as of October, 2012

- Wind Facilities
- Public Solar Facilities
- Private Solar Facilities



Wind and Photovoltaics at the Lowell National Historical Park Maintenance Facility



4 public schools including the Butler have added rooftop solar arrays



Lowell Regional Transit Authority Solar Array



Lowell Memorial Auditorium Solar Arrays



Many private residential and institutional developments incorporate renewable energy facilities



8

SEEK TO REDUCE THE ADVERSE IMPACTS AND SEVERITY OF FLOOD EVENTS.

- ❑ Enforce Conservation Commission conditions and those of other relevant regulatory bodies.
- ❑ Ensure compliance with new flood zones as dictated by the Federal Emergency Management Agency (FEMA).
- ❑ Ensure that new development that occurs within flood zones adequately mitigates and compensates for any impacts on flood storage and flood control.
- ❑ Preserve wetlands throughout the city, and identify areas to expand flood storage.
- ❑ Identify repetitive damage areas that have traditionally been susceptible to flooding.
- ❑ Adopt and implement a Green Streets Policy that provides guidelines and performance standards for LID practices as part of the Project Review process (use of pervious pavement, rain gardens, etc).
- ❑ Develop guidelines for low-impact development (LID) practices, which emphasize conservation and use of on-site natural features to mitigate flooding, and introduce performance standards that prioritize LID as part of the Project Review process.
- ❑ Require high standards for maintenance of flood storage systems, so as to ensure that, over time, stormwater continues to be managed on site.
- ❑ If permitted by state statute, explore the feasibility of developing a regional stormwater utility.
- ❑ Incorporate bio-retention practices into all new municipal parking lots and require these practices in private developments.
- ❑ Increase cooperation with surrounding towns and neighboring states to coordinate dam operations, manage flood control activities, and prevent downstream flooding.

Photo: DPD



Photo: DPD

- ❑ Educate owners of properties located within flood hazard areas as to proper flood mitigation practices, and notify eligible applicants of available hazard mitigation project grant funding.
- ❑ Consider participation in the federal Community Rating System to reduce flood insurance rates in Lowell through the implementation of flood plain management practices in excess of National Flood Insurance Program (NFIP) requirements.
- ❑ Develop location-specific strategies for neighborhoods already within the flood zone.
- ❑ Identify and seek public and private sector funding for residents and businesses to implement sound hazard mitigation measures.

- ❑ Pursue mitigation funding to reduce repetitive losses along Black Brook, Beaver Brook, and Clay Pit Brook.
- ❑ Install backflow prevention valves and other mechanisms on Combined Sewer Overflow (CSO) and stormwater outlets at appropriate locations throughout the city to prevent river backflow from inundating roadways, pump stations, and other critical facilities.
- ❑ Increase funding for and improve monitoring and maintenance of drainage infrastructure.
- ❑ Routinely monitor and repair flood control structures, levees, and canal walls to ensure structural integrity.
- ❑ Clean debris from canals and control structures.



FEMA-funded valves & pumps control flooding in Lowell.
Photo: New England Environmental Equipment



A parking lot incorporating bioretention practices
Photo: Montgomery County Planning



Branches dangerously close to power lines.

Photo: Photos o'Randomness

Xeriscaping can conserve precious water during warmer seasons.

Photo: DarkSevier



9 PREPARE PROACTIVELY FOR HEAT WAVES, DROUGHTS, ICE STORMS, AND OTHER TYPES OF NATURAL DISASTERS SO AS TO MITIGATE THEIR NEGATIVE IMPACTS.

- ☐ Participate more actively in the Northern Middlesex Council of Government's (NMCOG) regional Hazard Mitigation Plan development and the updating of the City's local Hazard Mitigation Plan.
- ☐ Educate residents so that they will be better prepared to endure periods of utility service disruption caused by natural disasters.
- ☐ Identify and publicize local and regional evacuation routes.
- ☐ Develop a heat response plan to serve vulnerable populations during a heat wave.
- ☐ Develop a water conservation plan to reduce water consumption during periods of drought.
- ☐ Identify contingency plans and alternative water sources in the event that the Merrimack River levels are reduced by drought to levels that impact the function and ability of the Lowell Regional Waste Water Utility to meet water demand.
- ☐ Conduct an inventory of buildings capable of implementing green roofs, and encourage their construction when such projects will have a meaningful impact.
- ☐ Maximize groundwater recharge and on-site retention of stormwater in new developments and significant paving or renovation projects.
- ☐ Encourage landscaping practices that minimize irrigation needs, rain barrel usage, and other water conservation measures.
- ☐ Develop a mitigation plan for protecting all cultural and historic resources from natural hazard damage.



Photo: JessicaTounzen, USNavy



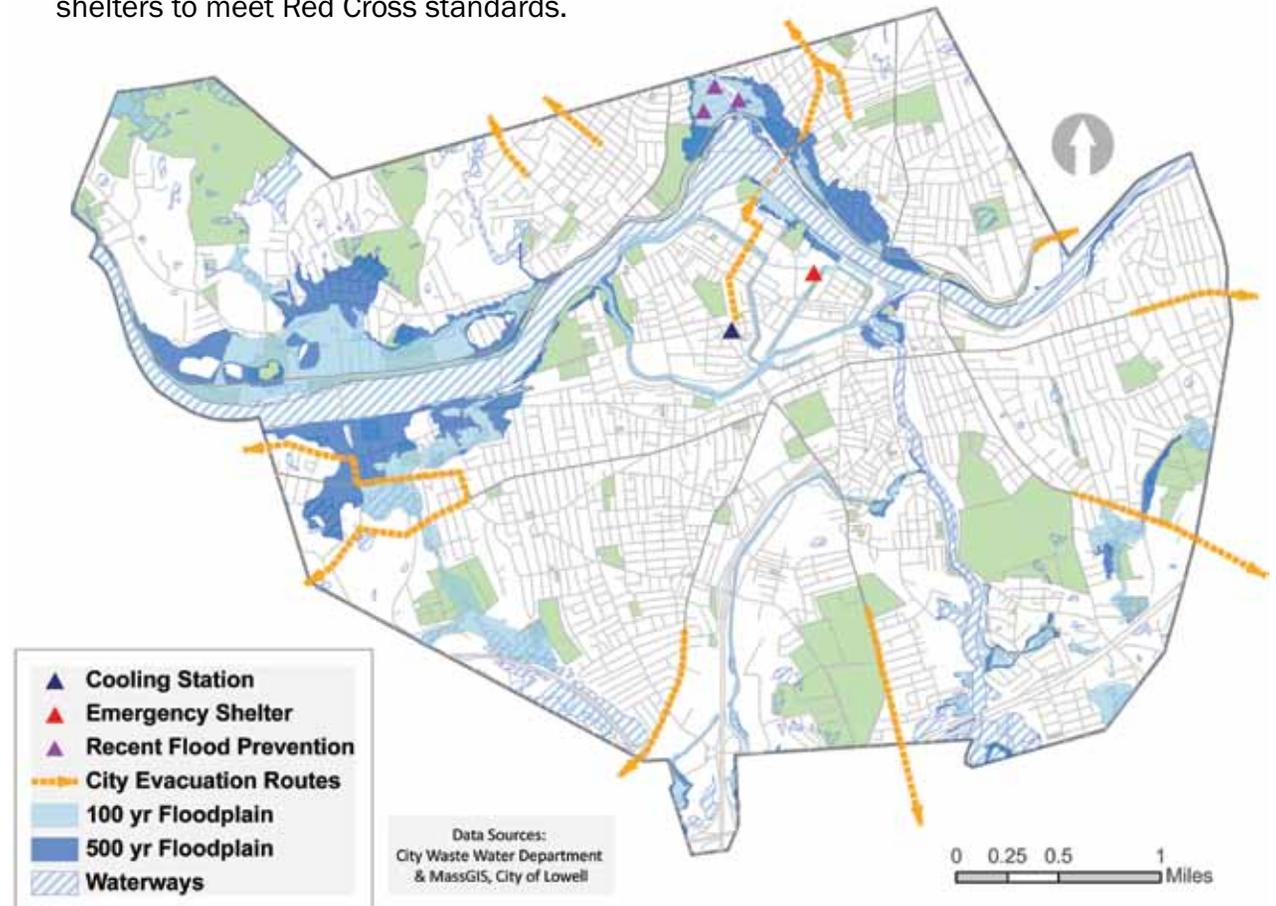
Lowell Emergency Management Truck

Photo: DPD

- ☐ Hold meetings and open houses to discuss water conservation opportunities and seek to replicate best practices from other municipalities.
- ☐ Inventory, map, relocate, and fortify any critical facilities that would be at risk during natural disasters.
- ☐ Replace obsolete snow plow equipment with modern and reliable equipment to increase efficiency and cost-effectiveness of snow operations.
- ☐ Identify power lines at risk and trim branches that could potentially down power lines, leading to prolonged power outages.
- ☐ Increase public preparedness regarding the dangers of natural disasters (including, but not limited to frost bite, hypothermia, and downed power lines) and develop multiple streams of communication during emergencies.
- ☐ Enforce state building codes designed to protect structures from high winds, earthquakes, fire, and snow loading.

- ☐ Identify potential heat island locations.
- ☐ Establish a warning center for use during natural disasters and upgrade temporary shelters to meet Red Cross standards.

Hazard Mitigation





Solar arrays on public schools can serve as educational tools.

Photo: DPD

10 EDUCATE THE PUBLIC ABOUT THE IMPORTANCE AND URGENCY OF CLIMATE CHANGE, AND CARBON EMISSION REDUCTION.

- Promote awareness of climate change through public events, festivals, community conversations, and other highly visible initiatives.
- Engage students and institutions through educational programs, community service, and service learning opportunities.
- Produce educational films, campaigns and other materials.
- Organize and promote friendly competitions citywide such as Getting to Zero and a One Gallon Challenge which encourage the community to adopt an ethic of sustainability.
- Make climate change and environmental quality data readily available to residents, community partners and other stakeholders through open source software and other engaging means.

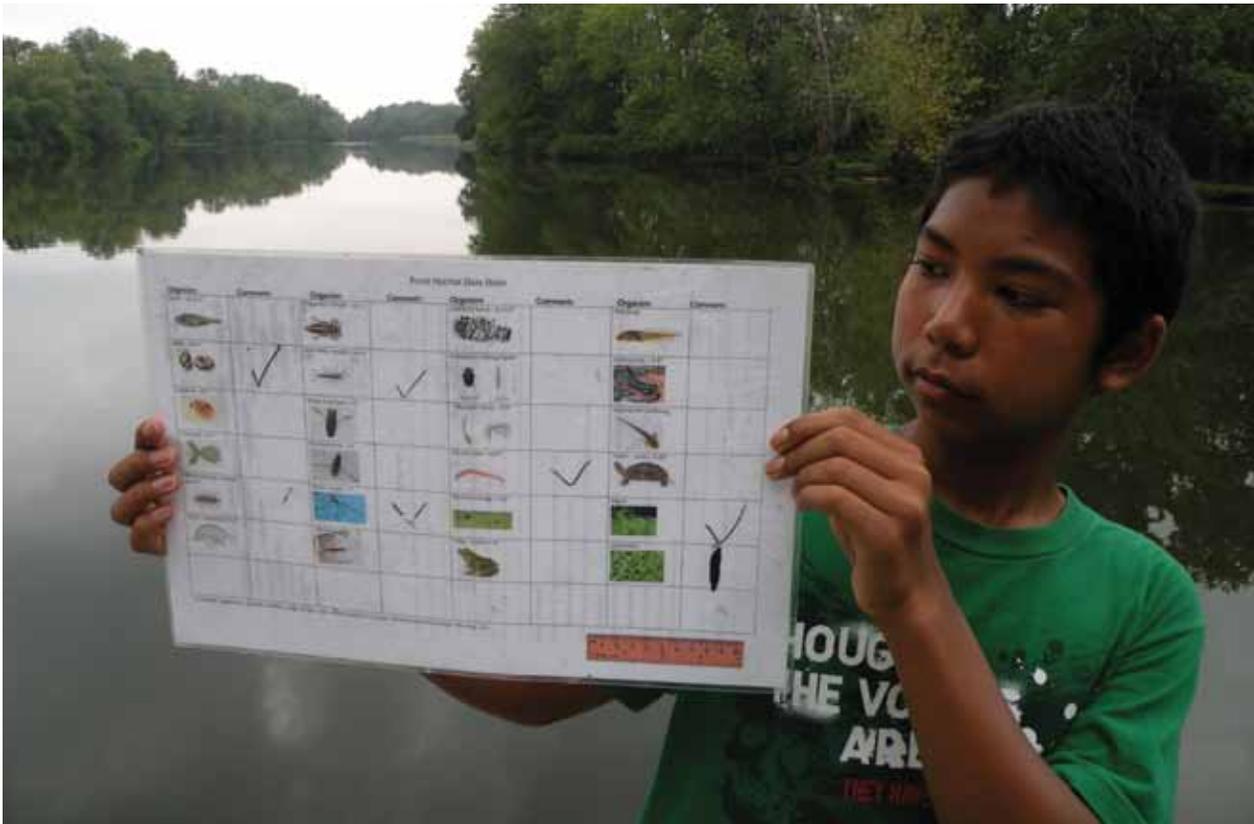


Photo: Lowell Parks & Conservation Trust
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	HISTORIC CHARACTER & PRESERVATION	HOUSING QUALITY & VARIETY	PUBLIC HEALTH & SAFETY	CIVIC ENGAGEMENT & COMMUNITY PRIDE	SOCIAL EQUITY	RECREATIONAL OPPORTUNITY	MULTI-MODAL TRANSPORTATION	RESOURCE & INFORMATION SHARING	COLLABORATIVE PARTNERSHIPS	LOCAL ECONOMIC DEVELOPMENT & INNOVATION	EDUCATION & TRAINING	TRANSPARENCY & ACCOUNTABILITY	JOB CREATION	ENVIRONMENTAL INVESTMENT	NATURAL RESOURCE PLANNING & POLICY	CARBON EMISSION CONSERVATION	EFFECTIVE & EFFICIENT OPERATIONS	ARTS & CULTURAL OPERATIONS	SHOPPING & ENTERTAINMENT	
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